SONY

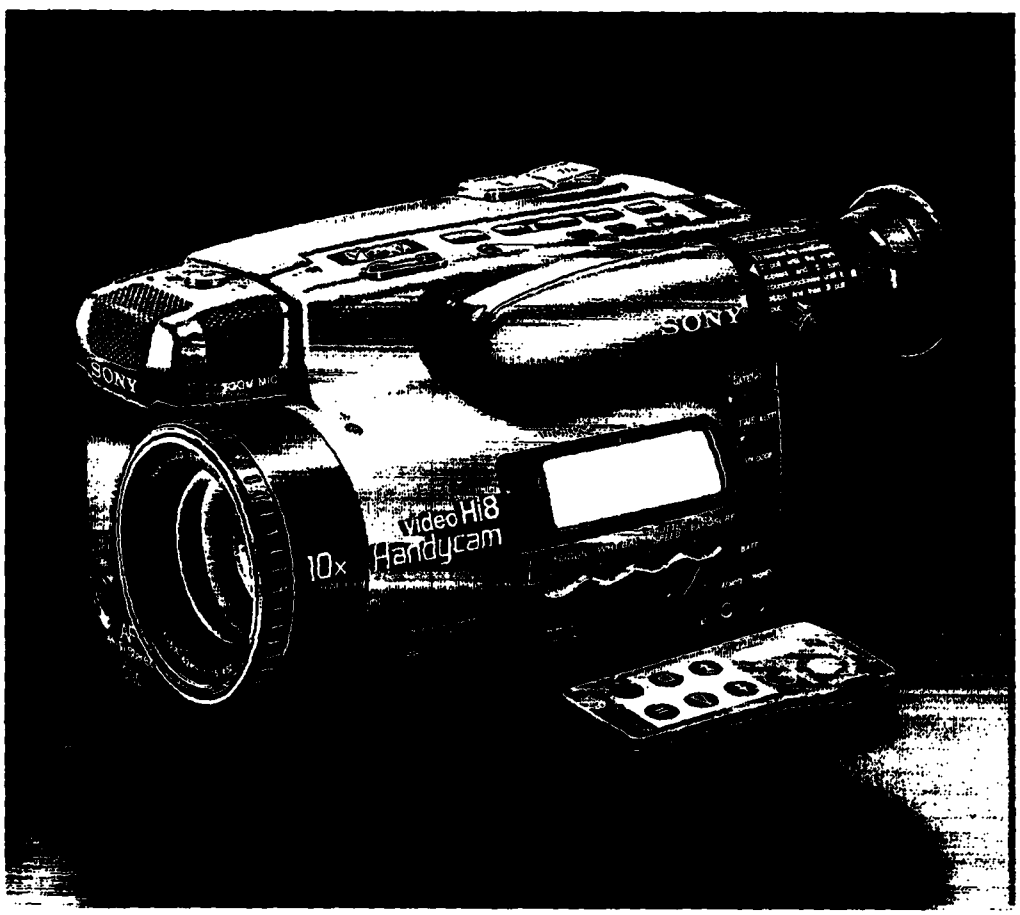
3-754-482-26 (1)

Video Camera Recorder Hi8

CCD-TR101

Operation Manual

Before operating this unit, please read this manual thoroughly and retain it for future reference.



video Hi8 Handycam

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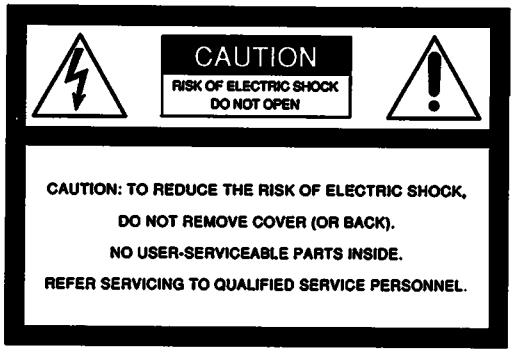
WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

This symbol is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Information for the customers in the U.S.A.
This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient the receiving antenna
Relocate the equipment with respect to the receiver
Move the equipment away from the receiver
Plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems".

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

Notice for the customers in Canada
This apparatus complies with the Class B limits for radio noise emissions set out in Radio Interference Regulations.

Owner's Record

The model and serial numbers are located on the bottom of the camcorder. Record the serial number in the space provided on the right hand. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. CCD-TR101

Serial No. _____

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Welcome to Video Hi8

Congratulations on your purchase of this Sony Handycam® camcorder. With your Handycam you can capture life's precious moments with superior picture and sound quality. Your Handycam is loaded with advanced features, but at the same time it is very easy to use. You will soon be producing home video that you can enjoy for years to come.

About This Manual

This manual shows you how to operate your camcorder. To get the most out of the features of the Handycam, read this manual thoroughly before you use your camcorder. If you want to shoot as soon as possible however, read the chapters, **Getting Started** and **Basic Operation** first. Once you are familiar with basic operations in these chapters, you may want to proceed to the chapter, **Advanced Camera Operation.**

- As you read through this manual, buttons and settings on the camcorder are shown in capital letters:
  e. g. Slide the POWER switch to CAMERA.
- Use "Identifying the Parts" at the end of this manual as a guide to find functions and operations printed on the camcorder itself.

Note on TV Color Systems

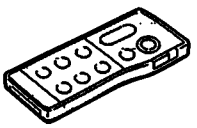
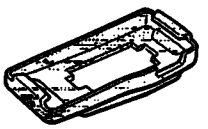
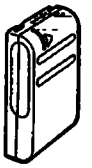
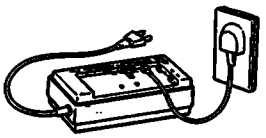
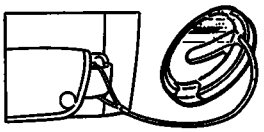
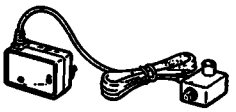
TV color systems are different depending on the countries.
If you view the playback picture on a TV, you need an NTSC system based TV or a PAL-M system based TV with NTSC/PAL-M transcoder (as this is an NTSC system based camcorder). Please check the list on page 54 to see the TV color system of your country.

Note on the Supplied RFU adaptor

You can use the supplied RFU adaptor only at the country where you bought this camcorder. Since each country has its own electricity and TV color system, you may not be able to use the RFU adaptor when you use the camcorder abroad.

Checking Supplied Accessories

Check that the following accessories are supplied with your camcorder.

• Wireless Remote Commander (1) ... Page 20 	• Remote Commander holder (1) ... Page 20 	• Battery pack NP-55H (1) ... Page 6 
• AC power adaptor AC-V30 (1) ... Page 6, 23 	• Lithium Battery CR2025 (2) (for camcorder/for the Remote Commander) ... Page 8	• Shoulder strap (1) ... Page 20
• Lens cap (1) (attached to the camcorder) ... Page 14, 16 	• Jack cover (1) (attached to the camcorder)	• A/V connecting cable (1) ... Page 18
• S video connecting cable (1) ... Page 18	• RFU adaptor RFU-90UC (1) ... Page 42 	

Before You Start

Before you can start using your camcorder, you need to:

1 Charge and install the battery pack.
2 Insert the lithium batteries.
3 Set the date and time.
4 Insert a tape.
5 Adjust the viewfinder lens to your eyes.

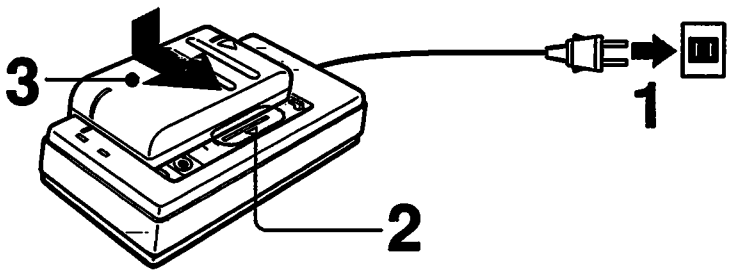
The following chapter takes you through these procedures step by step.

Charging and Installing the Battery Pack

Before you can use your camcorder, you first need to charge and install the battery pack.

Charging the Battery Pack

To charge the battery pack:



1 Plug the AC power adaptor into a wall outlet.
2 Align the flat side of the battery pack with the line on the AC power adaptor.
3 Push down and slide the battery pack in the direction of the arrow.

When charging is finished, the charge lamp goes out.

Required charging time:

Type of battery pack	NP-55H (supplied)	NP-77H/HD	NP-77	NP-66H	NP-55
Required charging time	70	140	120	110	60

(approx. minutes using AC-V30)

Important!

Use the battery completely before recharging!

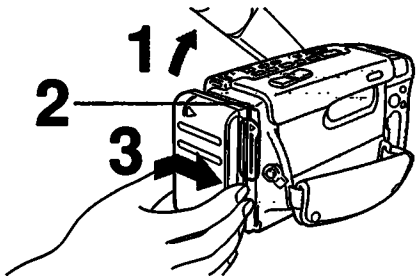
Before you recharge the battery, make sure the battery has been used (discharged) completely.

To use up the battery, remove the cassette and slide the POWER switch to CAMERA with the battery attached, and leave the power on until the ⮌ indicator and a red lamp flash inside the viewfinder.

The switch on battery pack
This switch is provided so that you can mark the charged battery. Set the switch to the "no mark" position when charging is completed. Set the switch to the "red mark" position when the battery is used up (or in whichever direction you want to remind yourself).

Installing the Battery Pack

When you have finished charging the battery, install the battery pack as follows:



1 Lift up the viewfinder.
2 Align the right side of the battery pack with the white line on the camcorder.
3 Slide the battery pack to the right.

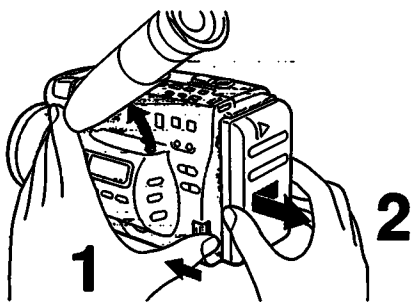
A fully charged battery pack lasts for:

Type of battery pack	NP-55H (supplied)	NP-77H/HD	NP-77	NP-66H	NP-55
Battery life	60	130	110	80	50

(approx. minutes, continuous recording when used indoors)

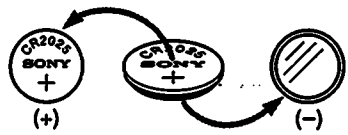
Removing the battery pack

Press BATT in the direction of arrow (1), and at the same time, slide out the battery pack to the left (2).



Inserting the Lithium Batteries

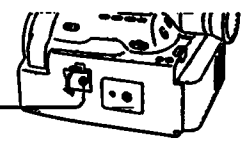
Your camcorder is supplied with two lithium batteries. One is for the camcorder, and the other is for the Remote Commander. Note that the lithium battery has a positive (+) and a negative (−) side as illustrated below. **Be sure to install the lithium battery with the positive side facing out.**



Inserting the Lithium Battery into the Camcorder

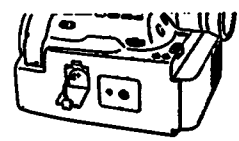
To keep a title in the camcorder's memory, as well as to activate the clock and the world clock, you must insert a lithium battery. Make sure you use one of the supplied lithium batteries.

1 **Open the lid of the lithium battery compartment located on the bottom of the camcorder.**



2 **Install one of the supplied batteries with the positive (+) side facing up.**

3 **Close the lid.**

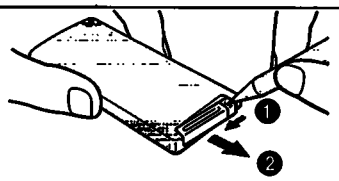


Changing the lithium battery

Open the lid of the lithium battery compartment at the bottom of the camcorder, pull out the lithium battery, and insert a new one.

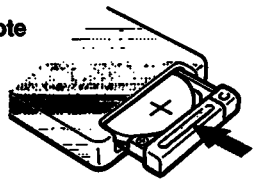
Inserting the Lithium Battery into the Remote Commander

1 **Pull out the lithium battery holder from the Remote Commander.**



2 **Insert one of the supplied batteries with the positive (+) side facing up.**

3 **Put the lithium battery holder back into the Remote Commander.**

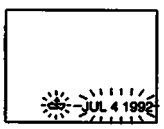


Changing the lithium battery

Pull out the lithium battery holder, and pull out the lithium battery, and insert a new one.

Lithium battery life

The battery for the camcorder lasts for about 1 year. When the battery becomes weak or dead, the date or time indicator keeps flashing in the display window and the indicator flashes inside the viewfinder for about 5 seconds when you set the POWER switch to CAMERA. The battery for the Remote Commander lasts for about 6 months. When the battery becomes weak or dead, the Commander does not work. In either cases, **replace the battery with a Sony CR2025 or Duracell DL-2025 lithium battery. Use of any other battery may present a risk of fire or explosion.**



Inside the viewfinder

In the display window

While replacing the lithium battery, keep the battery pack or other power source attached. Otherwise, you will need to reset the date, time and title.

WARNING

Battery may explode if mistreated. Do not recharge, disassemble, or dispose of in fire.

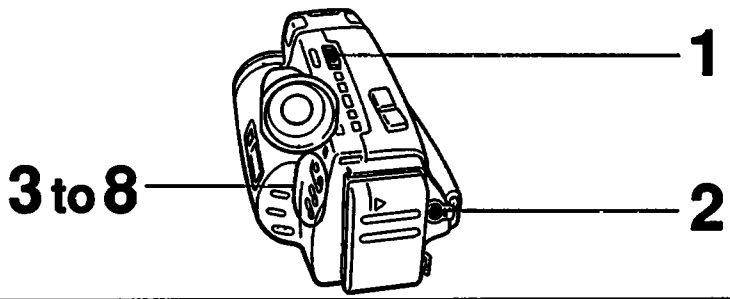
Cautions

- Keep the lithium battery out of the reach of children. Should the battery be swallowed, consult a doctor immediately.

Setting the Date and Time

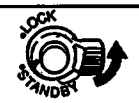
You need to set the camcorder's date and time to be able to superimpose the date and time onto your video.

Make sure that the battery is attached and the lithium battery is inserted.
Make sure you are looking at the display window. To check the area name, look into the viewfinder. About the world clock, see page 29.



1 **While pressing the small green button on the POWER switch, slide it to CAMERA.**

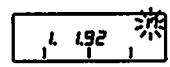
2 **Turn the STANDBY switch up.**



3 **Press DATE (+) and TIME (NEXT) simultaneously for at least 2 seconds until the area name and number appear inside the viewfinder and the area number appears in the display window.**

DATE now functions as + (to advance numbers) and TIME functions as NEXT (to set).

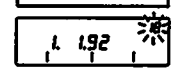
Inside the viewfinder



In the display window

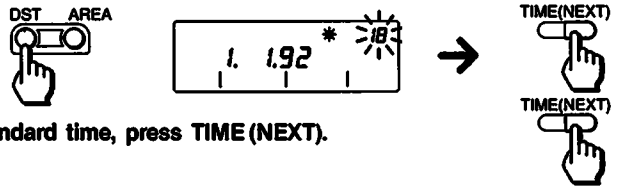
4 **Press DATE (+) to select your area name.**

The time zones and area names and numbers are as follows:



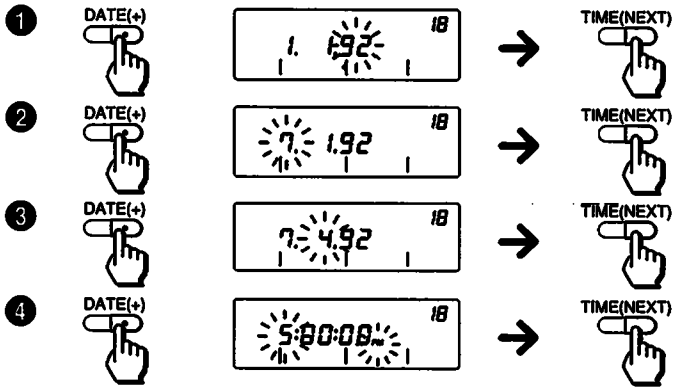
Time Zones	Area Name	Area Number
Hawaii Standard Time	HAWAII	15
Alaska Standard Time	ANCHRGE	16
Pacific Standard Time/West Canada	US. PST	17
Mountain Standard Time	US. MST	18
Central Standard Time	US. CST	19
Eastern Standard Time/East Canada	US. EST	20

5 **Choose one of the following options to set the clock:**
(a) For Daylight Savings Time, press DST. Then press TIME (NEXT).
The ☼ indicator appears inside the viewfinder and in the display window.



(b) For standard time, press TIME (NEXT).

6 **Adjust the flashing digits of the year, month, day and hour by pressing DATE (+) and TIME (NEXT).**
To set the year to 1992, no need to press DATE (+) in step ❶



Note:
- When you keep DATE (+) pressed, the digits advance faster.

7 **Adjust the flashing digits of minute by pressing DATE (+).**

8 **Press TIME (NEXT) to set the second to "00". The clock starts working.**

Correcting the date and time settings
Press TIME (NEXT) repeatedly until the minute digits stop flashing. Then repeat step 3 to 8.

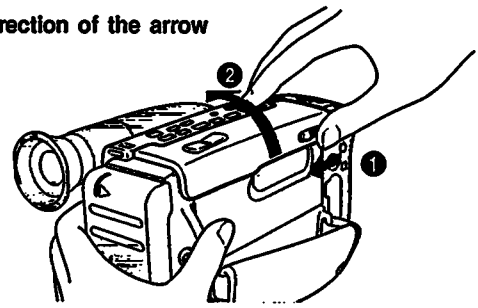
Checking the preset date and time
Press DATE (+) or TIME (NEXT). When you press the same button again, the indicator goes off.

Resetting to standard time
Press DST. The ☼ indicator goes off.

Inserting a Cassette

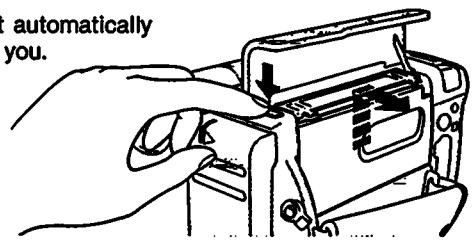
Make sure that the power source is attached before you insert a cassette. About the usable cassettes, see page 50.

1 **While sliding the lid lock in the direction of the arrow ❶, lift up the lid ❷.**

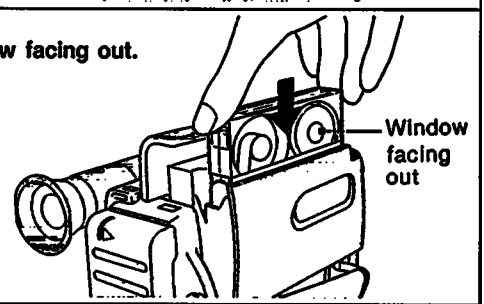


2 **Press EJECT.**

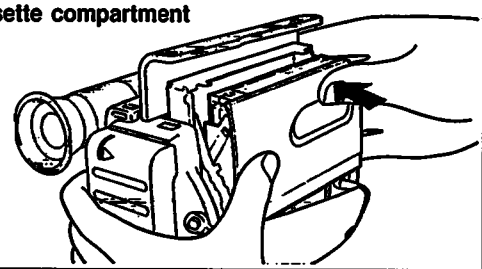
The cassette compartment automatically lifts up and opens toward you.



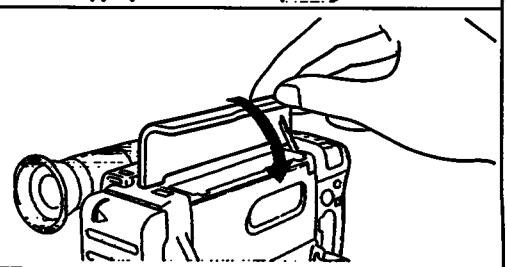
3 **Insert the cassette with the window facing out.**



4 **Press the PUSH mark on the cassette compartment cover to close it.**



5 **Close the lid.**

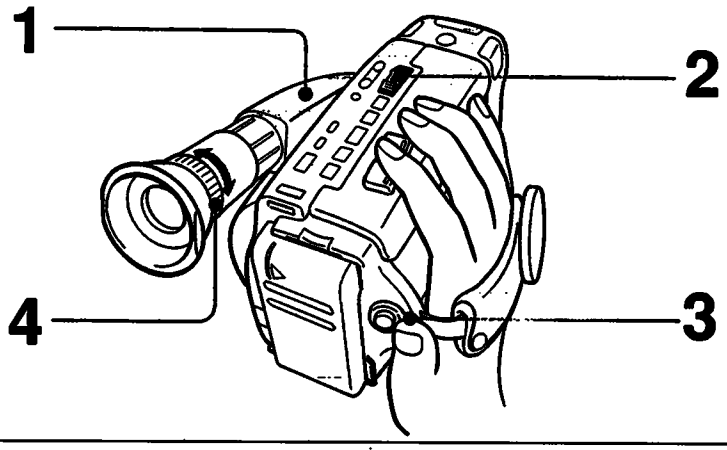


Adjusting the Viewfinder Lens

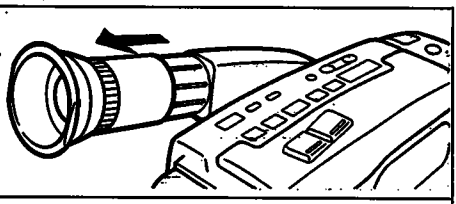
Before you use the camcorder for the first time (or after someone else has used it), adjust the viewfinder lens to best fit your eyesight. Make sure that the power source is attached to the camcorder, and a cassette is inserted.

If you wear glasses

You can bend back the eyecup to get a better view of the viewfinder.

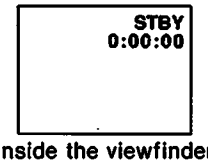


1 **Pull out the viewfinder until it clicks.**



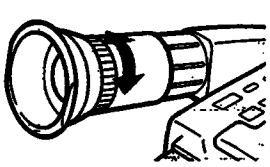
2 **While pressing the small green button on the POWER switch, slide it to CAMERA.**

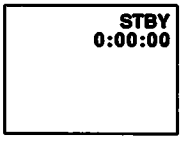
3 **Turn STANDBY up.**



Inside the viewfinder

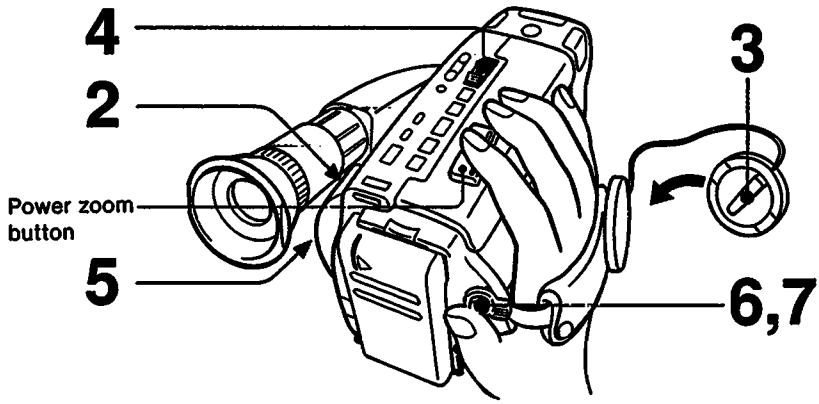
4 **Turn the viewfinder lens adjustment ring so that the "STBY" indicator inside the viewfinder screen comes into sharp focus.**





Camera Recording

This section describes the basic procedures for recording.
Make sure that the viewfinder is pulled out and a battery pack (see page 7) or any other power sources (see page 23) are attached. Before you record one-time events, you may want to make a trial recording to make sure that the camcorder is working perfectly.



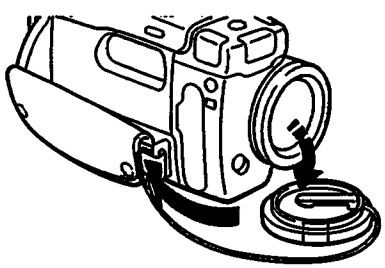
1 **Hold the camcorder as described below.**

Check that your thumb can easily touch START/STOP. Put your hand through the grip strap, hold your camcorder against your body and pull the strap upward.

2 **Slide Hi8 AUTO/OFF to AUTO.**

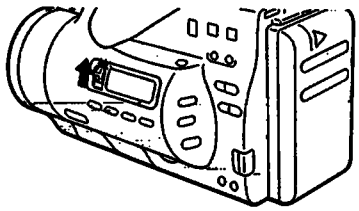
For details, see page 50.

3 **Remove the lens cap with squeezing its tabs and clip it on the grip strap cover.**



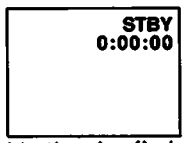
4 **While pressing the small green button on the POWER switch, slide the POWER switch to CAMERA.**

5 **Slide the AUTO LOCK switch up to turn on the AUTO LOCK lamp.** This switches all the camera functions automatic (i.e. autofocus, auto exposure, auto white balance) and sets the shutter speed to normal (1/60 second).



6 **Turn STANDBY up.**

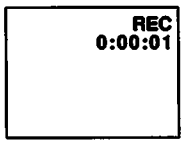
"STBY" indicator and tape counter appear inside the viewfinder. Now you can see through the viewfinder.



Inside the viewfinder

7 **Press START/STOP once.**

The camcorder is recording when the "REC" indicator appears and the Recording lamp lights up inside the viewfinder.



Recording lamp ⟶ ●

Inside the viewfinder, you can see a black and white picture of what you are recording, and information that indicates what the camcorder is doing.

Stopping recording momentarily

Press START/STOP again.
"STBY" appears inside the viewfinder.

Finishing recording

Turn STANDBY down and slide the POWER switch to OFF.

Ejecting the tape

Make sure that the power source is attached.
1 While sliding the lid lock to the left, lift the lid up.
2 Press EJECT.
3 Take out the cassette and press the area marked PUSH on the cassette compartment cover to close it.
4 Close the lid.

When you shoot a subject within 1 m (3.3ft) of the lens

If you cannot get a sharp focus while in extreme telephoto zoom, press the W side of the power zoom button until the focus is sharp.

Near the end of the tape

The indicator, the red lamp inside the viewfinder, and the camera recording/battery lamp on the camcorder flash slowly. When the tape reaches the end, the flashing becomes rapid.

Note on recording

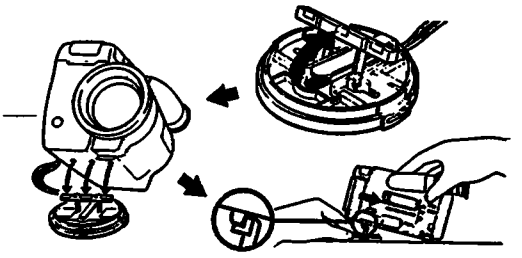
When you record from the beginning of the tape, run the tape for about 15 seconds before the actual recording. This will ensure that you will not miss any start-up scenes when the tape is played back.

If you leave the camcorder in the standby mode for 5 minutes or more

The camcorder goes off automatically. To re-enter standby mode, turn STANDBY down once and turn it up again. To start recording, press START/STOP.

Note on lens cap

You can use the supplied lens cap as a handy camcorder stand.



Zooming

Zooming is a recording technique that lets you change the size of the subject in the scene. Use "zoom-in (telephoto)" for dramatic close-ups, and "zoom-out (wide-angel)" for panoramic long shots. You can also use zooming to focus manually or to decide on a shooting angle. When you zoom in or zoom out, you can also set the sound to "zoom" along with the picture. For more professional-looking recordings, use zooming sparingly.

1 **Select the BUILT-IN MIC switch position.**

a) When you want to record the usual Hi-Fi stereo sound regardless of zooming, set the BUILT-IN MIC switch to the green mark position.

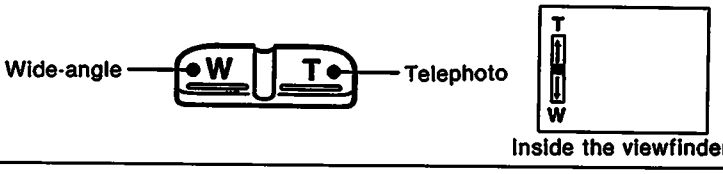
b) When you want the sound to "zoom" with the picture, set the BUILT-IN MIC switch to ZOOM MIC. ZOOM MIC indicator appears inside the viewfinder.

Note: When you set the BUILT-IN MIC switch to ZOOM MIC, the sound is recorded in monaural at the telephoto position.

2 **Press the T side or the W side of POWER ZOOM button.**

T side: for telephoto (subject appears closer)
W side: for wide-angle (subject appears farther away)

The camcorder's POWER ZOOM button offers two-levels of speed zooming. Press it firmly for high-speed zooming and softly for relatively slow zooming.

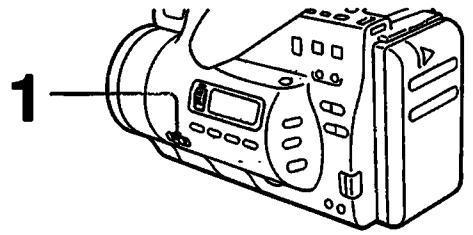


Notes

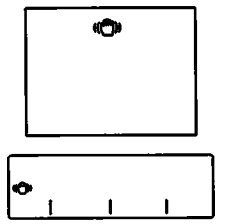
- When you zoom out with the tele-conversion lens (not supplied), the frame of the lens may appear on both sides of the picture. For details, consult your Sony dealer.
- You can shoot a subject that are at least 80 cm (about 31 1/2 inches) away from the lens surface in the telephoto position.

Getting a Steady Picture

You can use the Steady Shot function to correct recordings caused by accidental camera-shake. Use Steady Shot:
— When you zoom in
— When you shoot scenery from a car window
— When you shoot scenes while moving



1 **Set the STEADY SHOT switch to ON.**
The ((✋)) indicator appears inside the viewfinder and in the display window.



In the display window

To release Steady Shot function
Set the STEADY SHOT switch to OFF.

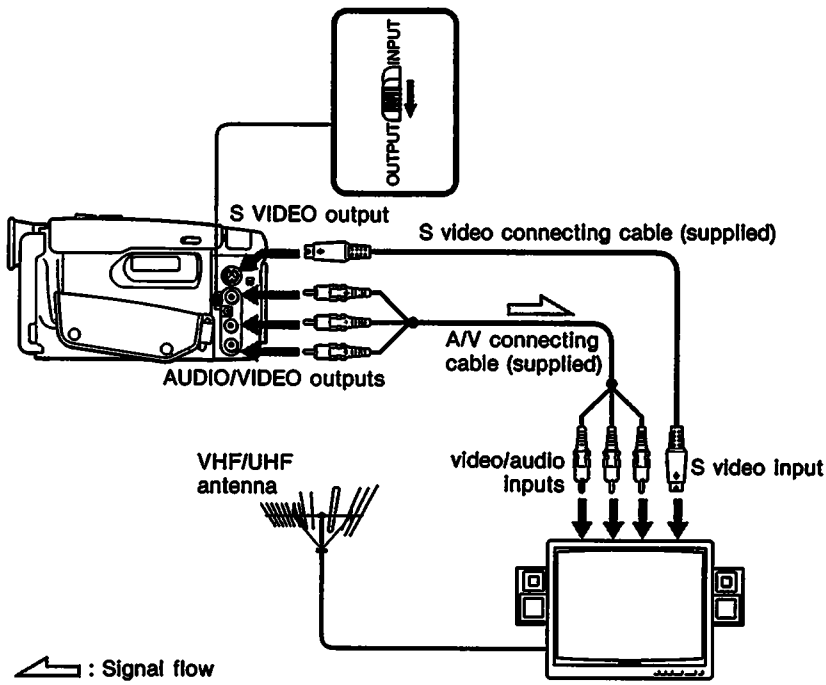
Notes on using Steady Shot
- To conserve the battery, set the STEADY SHOT switch to OFF when you don't need it. When it is set to ON, battery power is used up more quickly.
- Steady Shot will not correct excessive camera movement.
- When you shoot stationary objects with a tripod, set the STEADY SHOT switch to OFF.

Playing Back a Tape

You can use this camcorder to function as a VCR by connecting it directly to your TV for playback.

There are several ways to connect the camcorder to your TV. First check if your TV has video/audio inputs. If it does not, see page 42. You can also monitor the playback picture inside the viewfinder at the same time.

Connecting a TV with Video/Audio Inputs



1 Connect the camcorder and the TV using the supplied A/V connecting cable.

- If your TV has an S video input jack, connect it to the S VIDEO jack on the camcorder using the S video connecting cable (supplied). In this case, you do not need to connect the yellow (video) plug of the A/V connecting cable.
- If your TV is a monaural type, connect only the white plug for audio both on the camcorder and the TV. Do not use the red plug. In this case, the sound will be in monaural.

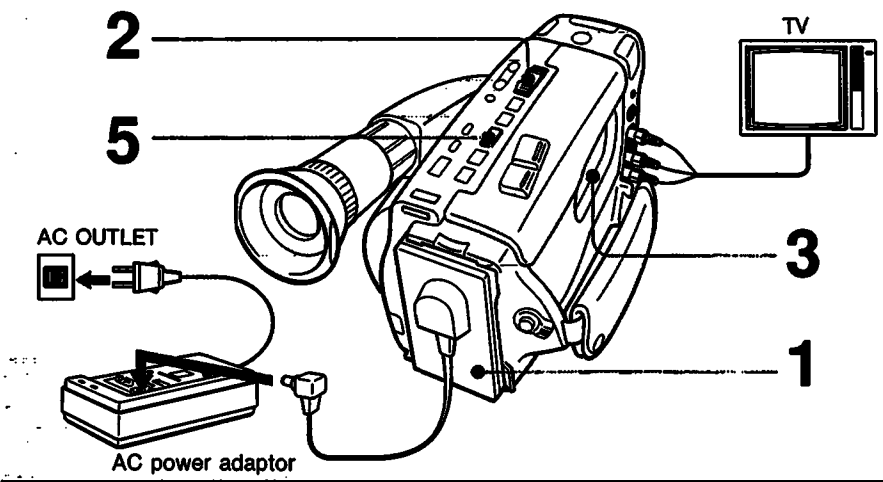
2 Set the INPUT/OUTPUT selector on the camcorder to OUTPUT.
3 Set the TV/VCR selector on the TV to VCR.

About the AUDIO/VIDEO jacks

The AUDIO/VIDEO jacks on this camcorder work as both input and output jacks. Set the INPUT/OUTPUT selector as follows.

in the OUTPUT position	to view the playback tape/to edit on another VCR
in the INPUT position	to record from another VCR or a TV

Playing Back a Tape



1 **Attach the connecting plate of the AC power adaptor to the camcorder and connect the AC power adaptor to a wall outlet.**
Make sure that the INPUT/OUTPUT selector on the camcorder is set to OUTPUT.

2 **While pressing the small green button on the POWER switch, slide it to VTR.**

3 **Insert a tape.**

4 **Set the TV/VCR selector on the TV to VCR.**
If you are connecting with an RFU adaptor, turn on the TV and select the channel that you selected for the RFU adaptor(3 CH or 4 CH).

5 **Press ▷ (PLAY).**
Playback starts.

To stop playback, press □(STOP).
To rewind the tape, press ◀◀ (REW).
To advance the tape rapidly, press ▶▶ (FF).

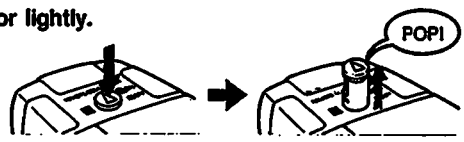
When you have finished playback

1 Slide the POWER switch to OFF.
2 Disconnect the AC power adaptor from the wall outlet.

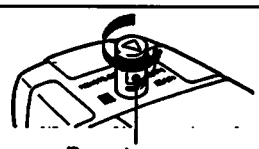
Using the Remote Commander

You can use the Remote Commander to record yourself with your friends or family, or conveniently control the playback of your tape from a distance.
Before you use the Remote Commander, insert a supplied lithium battery into it (see page 9) and turn on the POWER switch on the camcorder.

1 **Push the head of the remote sensor lightly.**
The remote sensor pops up.

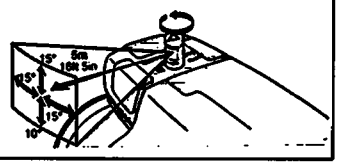


2 **Aim the remote sensor in the direction you want to control the camcorder.**



3 **Aim the Remote Commander at the remote sensor and press the appropriate button on the Remote Commander.**

Maximum distance and angle for remote control



To prevent misoperation

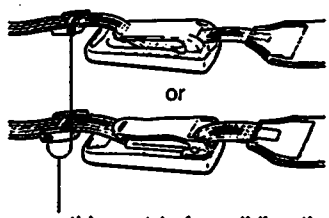
When you slide the HOLD switch in the direction of the arrow, none of the buttons on the Remote Commander will work. Use this to prevent any misoperation, such as accidentally pressing a button.

Using the Remote commander holder

You can clip the Remote Commander holder on your coat pocket or belt, or slide it onto the shoulder belt before attaching the Remote Commander to it.

To remove the Remote Commander from the holder

To attach the holder to the shoulder belt according to your supplied holder type*



Remove this part before sliding the holder onto the belt.

* There are two types of the holder.

Note

- If the Remote sensor is in sunlight or strong light, you may not be able to operate with the Remote Commander.
- This camcorder works through the signals of commander mode VTR2. A commander mode is used to distinguish this camcorder from other Sony VCR to avoid misoperation. If you use another Sony VCR at commander mode VTR 2, we recommend you change the commander mode or cover the remote sensor of the VCR with black paper.
- Be sure that there are no obstructions between the Remote Commander and the camcorder.

Getting the Most out of Your Battery Pack

This section shows you how you can get the most out of your battery pack.

Preparing the battery pack

Always carry additional batteries.

Have sufficient battery pack power to do 2 to 3 times as much recording as you have planned.

"Battery life" indicated in this manual is measured by the continuous recording time of the camcorder, placed at a room temparature using a fully charged battery.

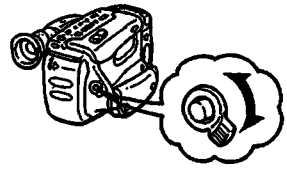
Battery life is shorter in cold environments

Battery efficiency is decreased and the battery will be used up more quickly if you are recording in cold environments.

Saving battery power

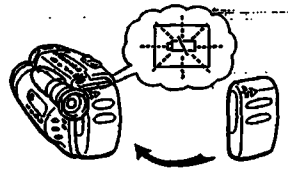
Turn STANDBY on the camcorder down when not recording to save battery power. A smooth transition between scenes can be made even if recording is stopped and started again.

While positioning the subject, selecting an angle, or looking through the viewfinder lens, the lens moves automatically inside the camcorder and the battery is used. The battery will be also used when a tape is inserted or removed.



When to Replace the Battery Pack

When the ⌂ indicator inside the viewfinder changes from slow flashing to rapid flashing while you are recording, slide the POWER switch to OFF and replace the battery pack. Leave the tape in the camcorder to obtain smooth transition scenes after the battery pack is replaced.



Notes on Charging

A brand-new battery

A brand-new battery pack is not charged. Before using the battery pack, charge it sufficiently.

A used battery pack

- Make sure to use up the battery before recharging.
- If recording is completed before the battery indicator appears inside the viewfinder, you should remove the tape, slide the POWER switch to CAMERA, turn up STANDBY, and leave the camcorder until the battery indicator flashes rapidly.
- When you use the AC-S10 power adaptor, the DC-S10 car battery charger, or BC-S10 portable battery charger, you can use the discharging function.
- **Charging the still usable battery causes a lowering of battery capacity. Battery capacity can be recovered if fully discharge and charge the battery again.**

Getting the Most out of Your Battery Pack

After long storage

Recharge the battery pack after a long period of storage.
If the battery pack is charged fully but not used for a long time (about 1 year), it becomes discharged.

Charge it again, but in this case the battery life will be shorter than normal. After several charging and discharging cycles, the battery life will recover its original capacity.

Note on the Terminals

If the terminals (metal parts on the back) are not clean, the battery duration will be shortened.

When the terminals are not clean or when the battery pack has not been used for a long time, install and remove the battery pack from time to time. This improves the contact condition. Also, wipe the + and − terminals with a soft cloth or paper.

Note on the Rechargeable Battery Pack

Battery heat up is normal

During charging or recording, the battery pack heats up. This is caused by energy that has been generated and a chemical change that has occurred inside the battery pack. This is not cause for concern.

Battery Care

- Remove the battery pack from the camcorder after using it, and keep it in a cool place. When the battery pack is attached to the camcorder, a small amount of current flows to the camcorder ever if the POWER switch is set to OFF. It causes overdischarging and shortens battery life.
- The battery pack is always discharging even when it is not in use after charging. Therefore you should charge the battery right before using the camcorder.

The life of the battery pack

The battery pack can be fully charged and discharged about 500 times under normal temperatures. ,If the battery indicator flashes rapidly just after turning on the camcorder with a fully charged battery pack, the battery pack should be replaced with a new fully charged one.

Charging temperature

You should charge batteries at temperatures from 10 °C to 30 °C (from 50 °F to 85 °F). Lower temperatures require a longer charging time.

Be sure to observe the following.

- **To prevent an accident caused by a short circuit, do not allow metal objects such as a necklace to touch the battery terminals. Carry the battery pack attaching to the terminal cover.**
- Keep the battery pack away from fire.
- Keep the battery pack dry.
- Do not open nor convert the battery pack.
- Do not expose the battery pack to any mechanical shock.

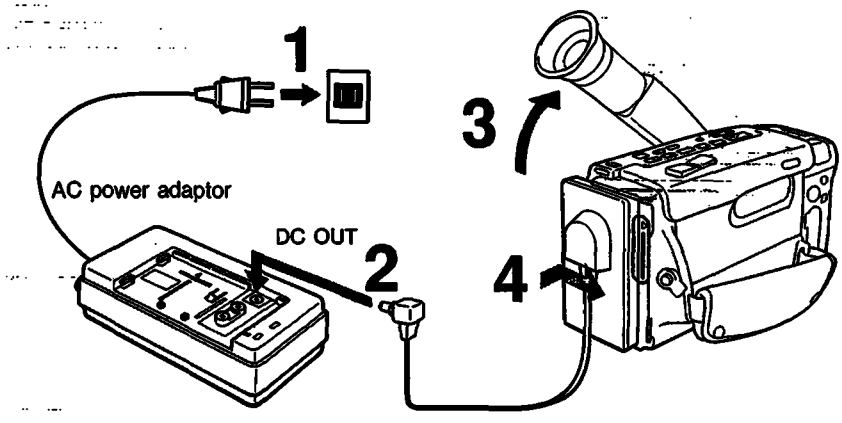
Alternative Power Sources

This section describes alternative power sources you can use for your camcorder: battery pack (see page 7), house current (on this page), and 12/24 V car battery (see page 24). Choose the appropriate power source depending on where you want to use your camcorder.

Place	Power source	Accessory to be used
Outdoors	Battery pack	Battery pack NP-55H (supplied), NP-77HD, NP-77H, NP-77, NP-66H, NP-55
Indoors	House current	AC power adaptor AC-V30 (supplied), AC-S10
In the car	12 V or 24 V car battery	DC pack DCP-77

Using House Current

To use the supplied AC-V30 AC power adaptor:



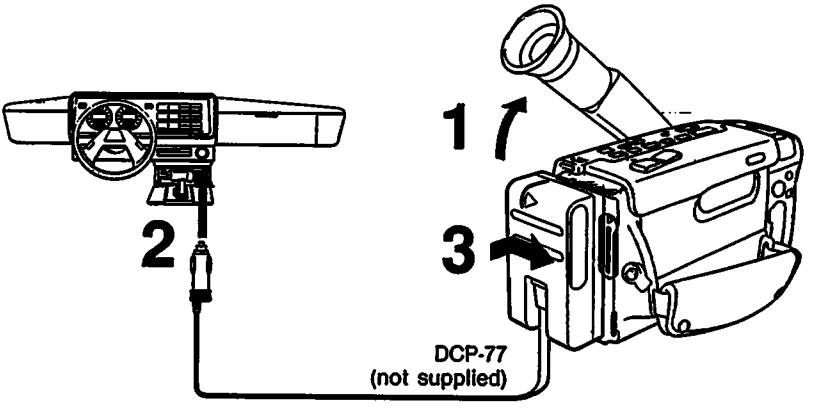
1 Connect the AC power adaptor to a wall outlet.
2 Insert the connecting cord supplied with the AC-V30 AC power adaptor into the DC OUT jack on the AC power adaptor.
3 Lift up the viewfinder.
4 Align the right side of the connecting plate with the white line on the camcorder, and slide it to the right.

Removing the connecting plate

The connecting plate is removed the same way as the battery pack. See page 7.

Using a Car Battery

To use the DCP-77 DC pack (not supplied):



1 Lift up the viewfinder.
2 Connect the cord of the DC pack to the cigarette lighter socket of the car (12 V or 24).
3 Align the right side of the DC pack with the white line on the camcorder, and slide it to the right.

Removing the DC pack

The connecting plate is removed the same way as the battery pack. See page 7.

Options for Charging

- AC-S10 AC power adaptor:
  You can charge a battery pack whether it is used up or not with this aqdaptor because it has discharging function.
- BC-55 or BC-77 portable battery charger (Ideal for travel):
  You can charge a battery pack on 100-240 V AC current.
- DC-S10 car battery charger: with discharge function. You can charge a battery pack through the cigarette lighter socket of a car.

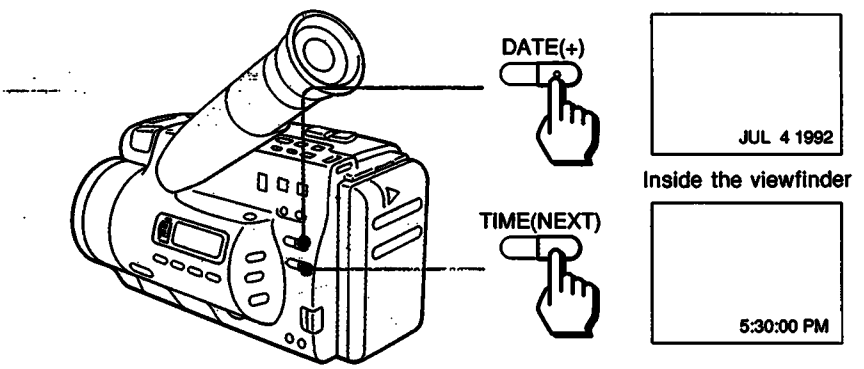
Camera Recording

In "Chapter 2: Basic Operation", you learned the basic recording operations. This section shows you how to record the date or time, re-record a picture, prevent accidental erasure, and more.

Recording the Date or Time

You can superimporse the date or time on your recording.

While you are recording or when the camcorder is in recording standby, press DATE for the date indicator or TIME for the time indicator. The date or time displayed inside the viewfinder is recorded with the picture.

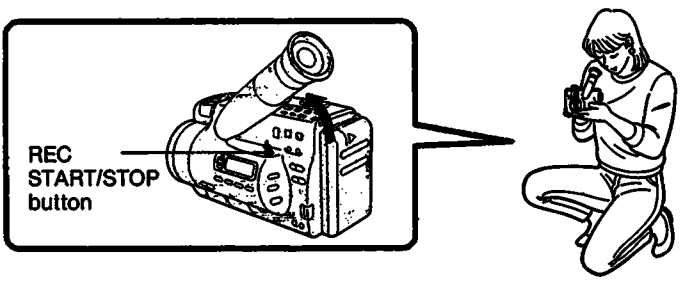


To stop recording with the date and time

Press DATE or TIME again. The date or time indicator disappears. The picture recording continues.

Recording in a Low-position

You can also record in a low position to get an interesting recording angle. When the viewfinder is pushed down, you can monitor the picture without being close to the viewfinder.



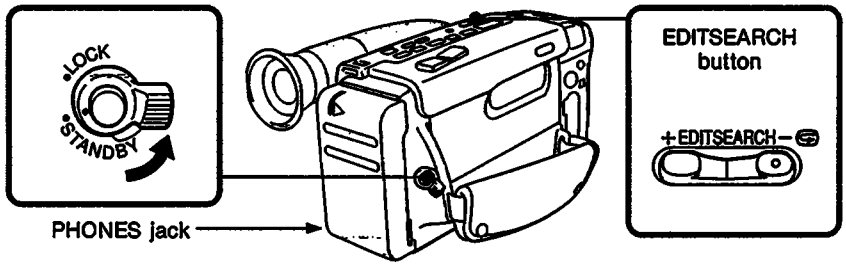
1 Adjust the viewfinder barrel. (You can turn it up to 90 degrees.)
2 Turn STANDBY up.
3 Press REC START/STOP.

To stop recording

Press REC START/STOP.

Checking the Recorded Picture Inside the Viewfinder (EDITSEARCH)

Using EDITSEARCH, you can review the last recorded scene or check the recorded picture inside the viewfinder.
After checking your recorded picture, you can also re-record over a previously recorded portion.



Reviewing the last recorded scene—Rec Review

You can check the last portion of a scene you just recorded in CAMERA mode. This is convenient for quick, on-the-spot checks.

1 Set the camcorder in standby mode by turning STANDBY up.
2 Press the − (⊜) side of EDITSEARCH momentarily.

The last few seconds of the recorded portion are played back inside the viewfinder. Then, the camcorder goes back to standby mode, ready for the next recording.

Checking your record picture

You can check the recorded picture inside the viewfinder. After checking, you can also re-record over a previously recorded portion.

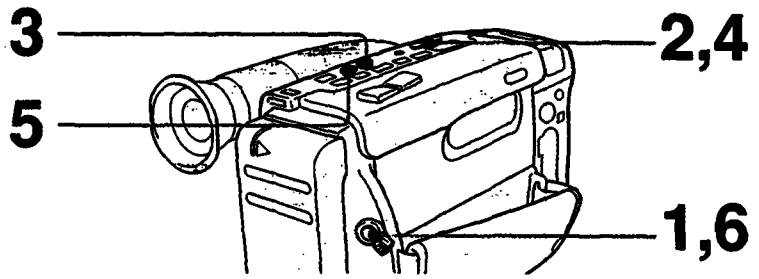
1 Set the camcorder in standby mode by turning STANDBY up.
2 Keep pressing the +side or − side of EDITSEARCH to play back the picture while looking inside the viewfinder.
+ side: to view the forward playback picture
− side: to view the reverse playback picture
To stop playback, release EDITSEARCH.
3 To re-record over a recorded portion:
1 Press the + side or − side of EDITSEARCH to locate the point you want to begin the re-recording.
2 Press START/STOP to begin re-recording.
Re-recording begins from the point you released EDITSEARCH. As long as you do not eject the tape, the transition between the scenes will be smooth.

Monitoring the sound while viewing the playback picture inside the viewfinder by using headphones (not supplied)

1 Connect headphones (not supplied) to the PHONES jack.
2 While pressing the small green button on the POWER switch, slide it to VTR.
3 Press ◀◀ to rewind the tape and press □ where you want to stop.
4 Press ▷ to start playback.

Inserting a Scene in the Middle of a Recorded Tape (Insert Recording)

You can insert a scene in the middle of a recorded tape by setting the starting and ending point. The previously recorded portion will be erased.

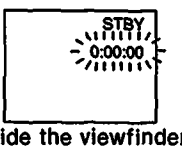


1 **Set the camcorder in standby mode by turning STANDBY up.**

2 **While looking inside the viewfinder, keep pressing the + (forward playback) or −(reverse playback) side of EDITSEARCH, and release the buttun where you want to end the insertion.**
The camcorder enters standby mode again.

3 **Press RESET.**

The counter resets to zero.
This works as an end point mark.

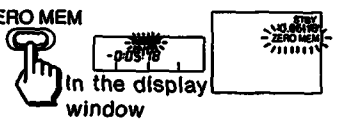


Inside the viewfinder

4 **While looking inside the viewfinder, keep pressing the − side of EDITSEARCH and release the button at the point where you want to start the insertion.**

5 **Press ZERO MEM.**

The insert ending point is stored in memory.



In the display window

6 **Press START/STOP.**
Insert recording begins. The insert recording stops automatically at the counter zero point.

Canceling ZERO MEM

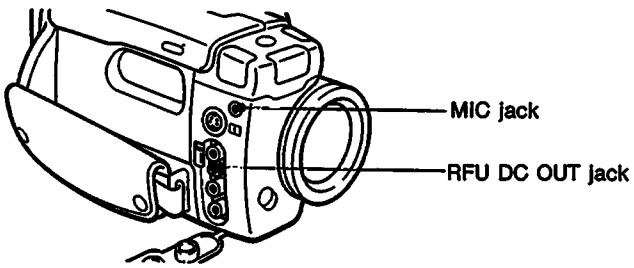
Press ZERO MEM.

Note

The picture may be slightly distorted at the ending point when played back.

Recording with an External Microphone

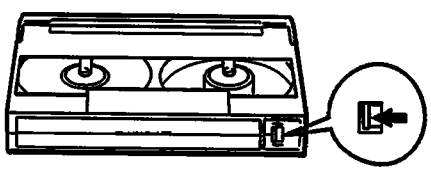
You can connect an optional external microphone (stereo or monaural) to the MIC jack. This jack also accepts a "plug-in-power" microphone. If the microphone has two plugs, connect the DC IN plug to the RFU DC OUT jack of the camcorder. If you want to attach the microphone to the camcorder, you also need an optional shoe attachment.



Preventing Accidental Erasure

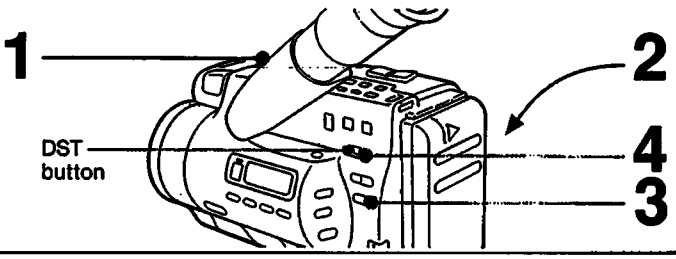
To prevent accidental erasure, slide the tab on the cassette to expose the red mark.

If you try to record with the red mark exposed, the and ⏏ indicator flash inside the viewfinder and in the display window, and you cannot record. To re-record on this tape, slide the tab back out covering the red mark.



Using the World Clock

You can reset the clock according to the time zone of the location you're using the camcorder by pressing the AREA button.
Before using the world clock, set the date and time settings (see page 10).

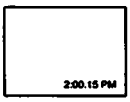


1 **While pressing the small green button on the POWER switch, slide it to CAMERA.**

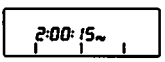
2 **Turn STANDBY up.**

3 **Press TIME.**

The date or time settings appear.



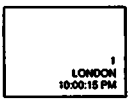
Inside the viewfinder

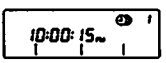


In the display window

4 **Press AREA until the name and number of the time zone of the location you're using the camcorder appear.**

The 🕒 indicator appears in the display window. You can find the area name and number in the "Time zone chart" on the next page.



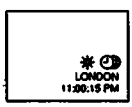


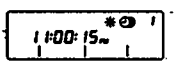
Checking the date

Press DATE (+). To turn off the date indicator, press DATE (+) again.

Adjusting to daylight savings time

Press DST. The time changes to daylight savings time.
To reset to Standard time, press DST again.

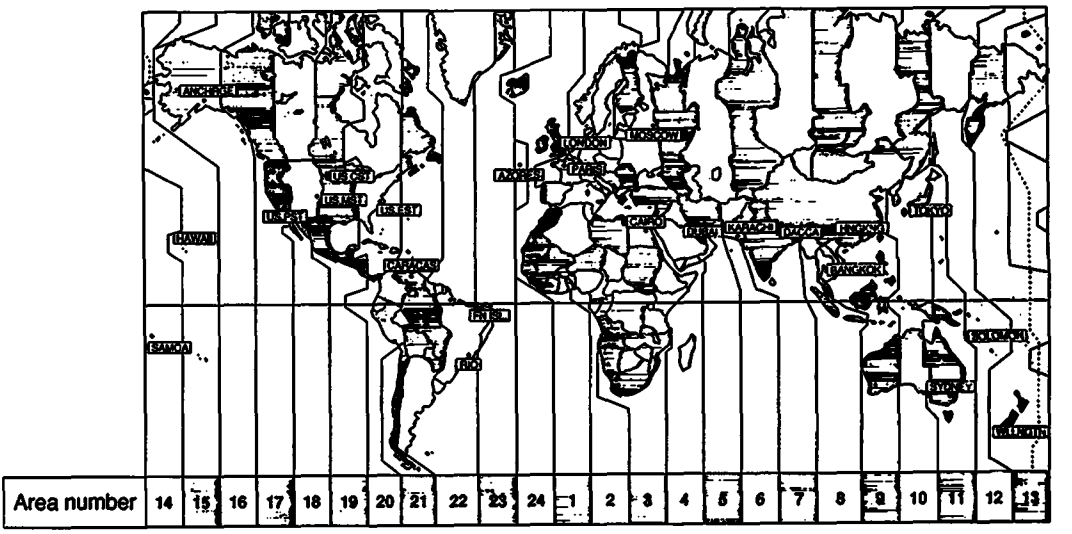




Re-setting to your home area time again

Press AREA until your home area name appears.

Time zone chart

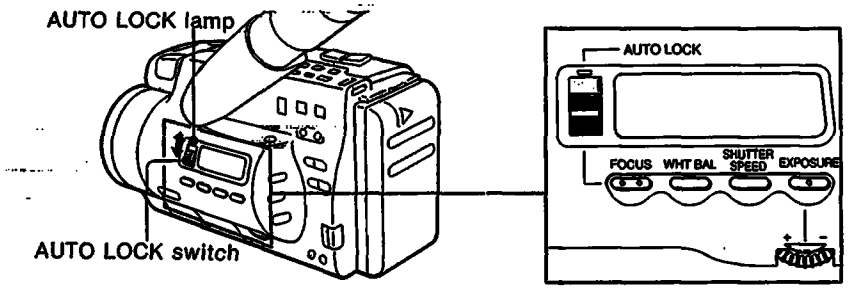


Area number	Area name	Nations or area*
1	LONDON	England, GMT (Greenwich Mean Time), Portugal
2	PARIS	Austria, France, Germany, Italy, Netherlands, Spain, Sweden, Switzerland
3	CAIRO	Egypt, Greece, Israel, Turkey
4	MOSCOW	Iraq, Kenya, Saudi Arabia, former U.S.S.R. (west)
5	DUBAI	United Arab Emirates
6	KARACHI	Moldives, Pakistan
7	DACCA	Bangladesh, India, Myanmar
8	BANGKOK	Cambodia, Indonesia (Jakarta), Thailand, Vietnam
9	HNGKNG	Australia (west), China, Hong Kong, Indonesia (Bali, Borneo), Malaysia, Philippines, Singapore, Taiwan
10	TOKYO	Japan, Korea
11	SYDNEY	Australia (east), Guam, Saipan
12	SOLOMON	New Caledonia
13	WLLNGTN	Fiji, New Zealand
14	SAMOA	Western Samoa
15	HAWAII	HST (Hawaii standard time), Tahiti
16	ANCHRGE	AST (Alaska standard time)
17	US. PST	PST (Pacific standard time)
18	US. MST	MST (Mountain standard time)
19	US. CST	CST (Central standard time), Mexico
20	US. EST	EST (East standard time), Peru
21	CARACAS	Chile, Venezuela
22	RIO	Argentina, Brazil
23	FN ISL.	Fernando de Noronha
24	AZORES	Azores Islands

* These are common names. They may be different from formal country names.

Selecting Automatic/Manual Adjustment Mode

This section shows you how to record by using manual adjustment functions. The camcorder's automatic functions offer you worry-free operation under most shooting conditions. But in some circumstances, manual adjustment is better for creative recording. You can manually adjust the focus, white balance, exposure and/or shutter speed with this camcorder:



Automatic adjustment

Slide the AUTO LOCK switch up to turn on the AUTO LOCK (green) lamp.
The camcorder adjusts the focus, white balance, and exposure automatically. It also sets the shutter speed to 1/60.

Manual adjustment

Slide the AUTO LOCK switch down to turn off the AUTO LOCK lamp.
You can adjust the focus, white balance, exposure, and speed shutter manually. Even if you slide the AUTO LOCK switch down, only the settings you made during manual adjustment have been changed. The other settings remain the same as those in automatic adjustment.

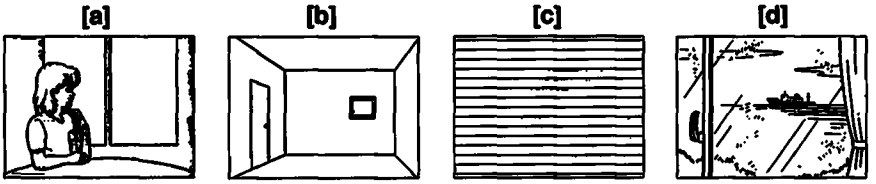
About the previous settings

The settings you made with manual adjustment are retained in the following case:
— When you slide the AUTO LOCK switch up after you have made manual adjustment and then slide it down again.
— When you set the POWER switch to OFF
But, they are canceled if it passes more than 5 minutes after you have detached the battery.

Focusing Manually

When to use manual focus

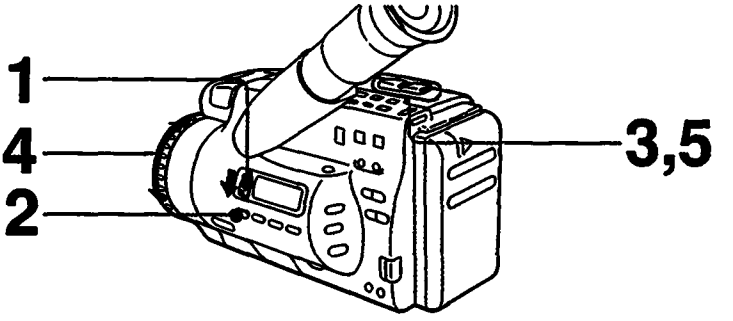
In the following cases you should obtain better results by adjusting the focus manually.



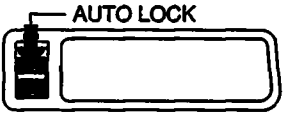
- **[a]** Too much brightness behind the subject
- **[b]** Subjects with little contrast – – – walls, sky, etc.
- **[c]** Horizontal stripes
- **[d]** Subjects through frosted glass
- Insufficient light
- One subject is close; the other is in the center, but at a distance
- Subjects beyond nets, etc., or another subject passes in front of the camcorder
- Bright subject or subject reflecting light
- High contrast behind the subject (the background may be focused)
- When shooting a stationary subject using tripod
- When you want to save battery power

Focusing Manually

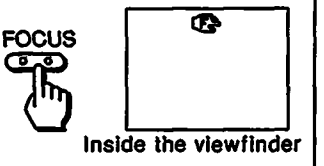
When adjusting the focus manually, the best way is to first adjust at telephoto position before recording, then set the desired zoom angle.



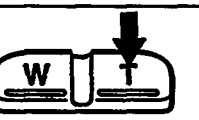
1 **Slide the AUTO LOCK switch down to turn off the AUTO LOCK lamp.**



2 **Press FOCUS.**
The indicator appears inside the viewfinder. This indicates that you are in manual focus mode.

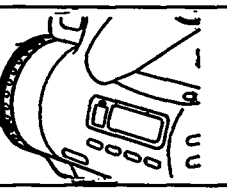


3 **Keep pressing the T (telephoto) side of the power zoom button until the zooming stops.**



4 **Turn the focus ring to achieve sharp focus.**

Note
The focus ring does not have a stop position.



5 **Set the desired shot length using the power zoom button.**

To reactivate autofocusing

Press FOCUS until the indicator inside the viewfinder disappears.

Shooting in relatively dark places

When shooting in relatively dark places such as indoors, the depth of field (distance range of the subject that will be in sharp focus) is very shallow. For best results, shoot at wide angle after focusing in the telephoto position.

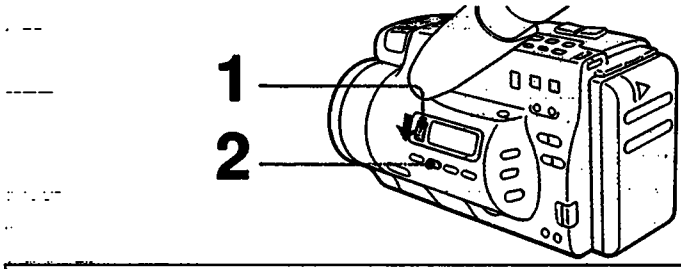
Adjusting the White Balance

What is white balance

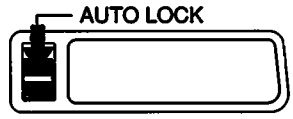
White balance is the adjustment to make white subjects look white and to obtain a more natural color balance for camera recording.
In the following cases, you should obtain better results by adjusting the white balance manually.

Conditions	White balance mode (indicator inside the viewfinder)
Lighting conditions change quickly	☼ (in door)
Conditions too bright, such as in photography studios	
Under sodium lamps	
Under mercury lamps	
Monochromatic subject or background	HOLD
Under a color matching fluorescent lamp	☀ (out door)
Recording: • a sunset/sunrise • just after sunset • just before sunrise e.g. neon signs, fireworks	

Adjusting the White Balance



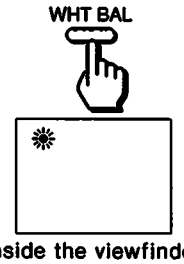
1 **Slide the AUTO LOCK switch down to turn off the AUTO LOCK lamp.**



2 **Select the desired white balance mode by pressing WHT BAL.**

Each time you press the button, the indicator inside the viewfinder changes as follows:

No indicator (auto) → HOLD → ☀ (outdoor) → ☼ (indoor)



Inside the viewfinder

Note

When you adjust the white balance manually, make sure you re-adjust white balance when moving from indoors to outdoors, or vice-versa.

Locking the White Balance Setting (HOLD Mode)

HOLD mode allows you to lock in to certain white balance level.

What is HOLD mode?

When you set the white balance at HOLD mode, the last automatic white balance setting you made will be locked and maintained even if lighting conditions change. You should obtain better results by using the HOLD position when you shoot monochromatic subjects or backgrounds.

To enter HOLD mode

1 Slide the AUTO LOCK switch up to turn on the AUTO LOCK lamp.
The camcorder adjusts the white balance automatically.
2 Point the camcorder at a white, flat object such as a white wall or paper for about 15 seconds.
3 Slide the AUTO LOCK switch down to turn off the AUTO LOCK lamp.
4 Press WHT BAL to display the HOLD indicator inside the viewfinder.

When you detach the battery or change the white balance setting, the locked white balance setting is no longer maintained. In this case, re-enter HOLD mode by following the procedures above again.

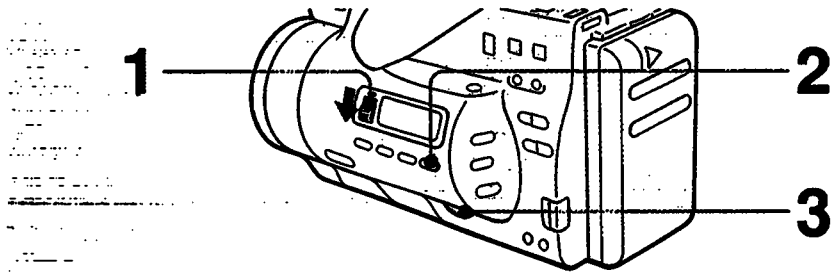
Adjusting the Exposure

When you adjust the exposure

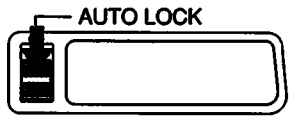
In the following cases you should obtain better results by adjusting the exposure manually.

Conditions	Turn the EXPOSURE dial:
The background is too bright (backlighting)	upward
Insufficient light: most of the picture is dark.	
Bright subject and dark background	downward
To record the darkness faithfully	

Adjusting the Exposure



1 **Slide the AUTO LOCK switch down to turn off the AUTO LOCK lamp.**



2 **Press EXPOSURE.**

The exposure is locked at the actual brightness.
The exposure indicator appears inside the viewfinder and EXPOSURE MANUAL indicator appears in the display window.

Inside the viewfinder

3 **Adjust the exposure by turning the EXPOSURE dial upward or downward.**

The exposure is locked at the adjusted brightness.

To re-enter the automatic exposure mode

Press EXPOSURE so that the exposure indicator inside the viewfinder disappears.

Using the High-speed Shutter

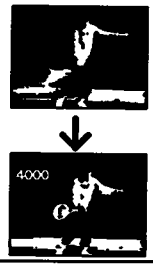
When you record a fast-moving subject, choose a higher shutter speed. The movement will look sharper during freeze frame when the tape is played back with an 8mm recorder that has the clean still function. Remember that you need enough lighting to use the high-speed shutter.

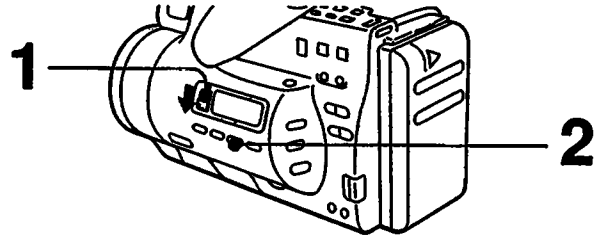
To choose the best shutter speed

Example use	For your selection
• On clear days, recording golf or tennis swing (To view the hit ball clearly in the still picture mode, set to 1/10000 or 1/4000) • Recording skiers	1/10000 or 1/4000 or 1/2000
• On overcast days, recording a moving carousel or roller coaster • Recording outdoors from inside a moving vehicle (for stable shooting)	1/1000 or 1/250
• Instead of using the ND2 (neutral density) filter (To reduce the exposure level to about half) • Recording indoor sports (for stable shooting)	1/100

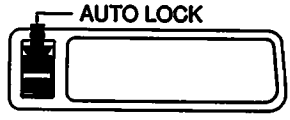
Selecting the Shutter Speed

You can select the shutter speed from 1/60 to 1/10000.



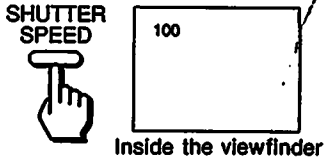


1 **Slide the AUTO LOCK switch down to turn off the AUTO LOCK lamp.**



2 **Press SHUTTER SPEED repeatedly until the desired shutter speed indicator appears inside the viewfinder. Each time you press the button, the indicator changes as follows:**

No indicator (1/60) → 100 (1/100) → 250 (1/250) → 1000 (1/1000) → 2000 (1/2000) ← 4000 (1/4000) ← 10000 (1/10000) ↑ No indicator (1/60)

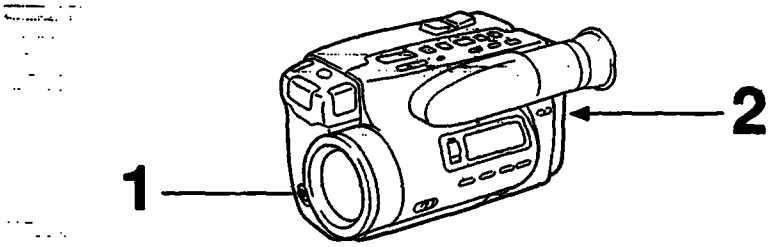


Note on shutter speed

- When you select shutter speed 1/250 or faster, record under sunlight or use a video light.

Fade-in and Fade-out

You can fade a picture in or out with the sound to give your recording a professional touch. When fading-in, you can make the picture gradually appear from black or mosaic while increasing the sound. When fading-out, you can make the picture gradually fade to black or mosaic while decreasing the sound.

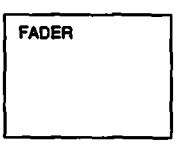


1 **Select the type of fade by pressing FADER as follows:**

(a) When fading-in, press it after turning STANDBY up to put the camcorder into standby mode. The fade indicator starts flashing.
(b) When fading-out, press it while recording. The fade indicator starts flashing.

Note on the FADER button
Each time you press FADER, the indicator changes as follow:

FADER (black fade) → M. FADER (mosaic fade) → No indicator



Inside the viewfinder

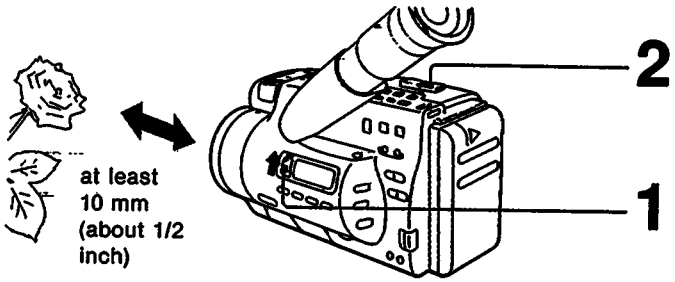
2 **Press START/STOP.**
When fading-in, the fade indicator stops flashing and the recording starts fading in.
When fading-out, the fade indicator stops flashing, the picture fades out, and then the recording stops.

Canceling the fade-in/fade-out function
Before pressing START/STOP, press FADER so that the FADER indicator disappears.

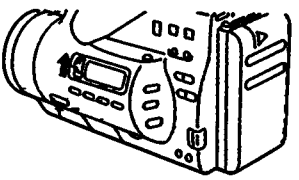
Close-up (Macro)

This section shows you how to shoot small subjects such as flowers, insects and photographs.

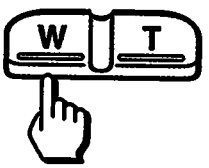
You can shoot subjects that are at least 10 mm (about 1/2 inch) away from the lens surface.

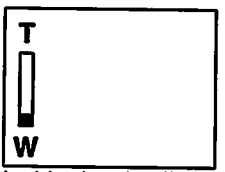


1 **Slide the AUTO LOCK switch up to turn on the AUTO LOCK lamp.**



2 **Press the W side of the power zoom button until the indicator inside the viewfinder stops at the W end.**





Inside the viewfinder

Manual adjustment

You can shoot with manual focus while doing close ups. For details, see page 31.

Note

When doing close ups, the depth of field (distance range of the subject that will be in sharp focus) is very shallow, so pay attention to focusing. To keep the subject in focus, use a tripod.

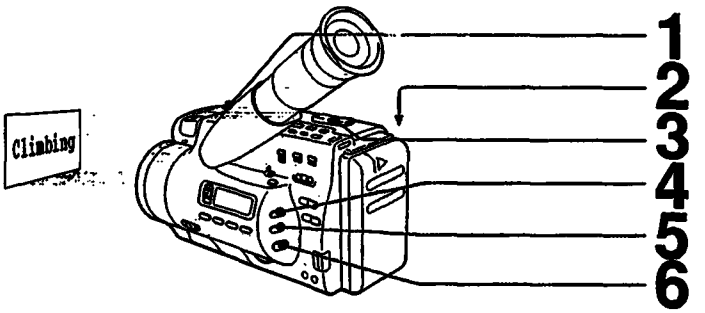
Superimposing Text

This section shows you how to superimpose your own hand written message (title) or graphics over the scene.

Inside the viewfinder

Storing a Title

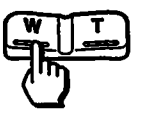
You can store one title at a time.
Before you store the title, first make a card for the title. Use a plain, white card and write a title with a dark-colored marker in thick letters. You can also use the available graphics or a sign if they are thick enough and have contrast.
Before you begin, make sure that the lithium battery is installed.



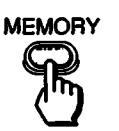
1 **While pressing the small green button on the POWER switch, slide it to CAMERA.**

2 **Turn STANDBY up to put the camcorder into standby mode.**

3 **Point the camcorder at the title card and adjust the focus.**



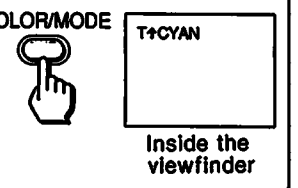
4 **Press MEMORY to store the title.**



5 **Press COLOR/MODE and select the title color.**

Each time you press the button, the color indicator changes as follows:

WHT (white) → BLUE → GRN (green) → CYAN
↑ ↓
BLK (black) ← YEL (yellow) ← VIO (violet) ← RED



6 **Press SUPERIMPOSE ON/OFF to turn off the title.**

Now, the title is stored in memory.

Checking the title

Press SUPERIMPOSE ON/OFF in standby mode.
To turn off the title, press the button again.

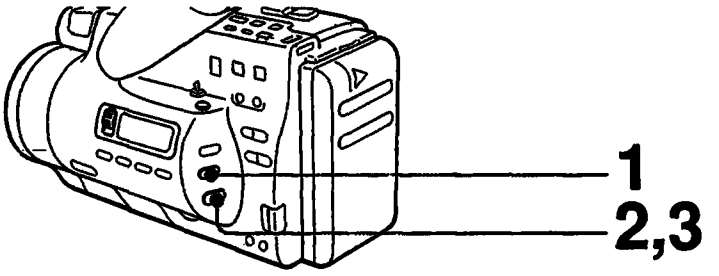
Selecting the display mode of the title

You can scroll your title up or down like scrolling credits in a movie. Also, you can reverse the title.

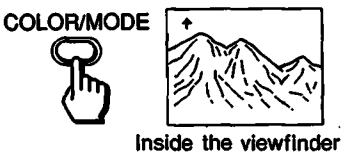
Display mode	Indicator inside the viewfinder
Scrolling up the title The title scrolls up and stops at the center.	↑
Scrolling down the title The title scrolls down and stops at the center.	↓
Reversing the title with the picture	T
Scrolling up the reversed title	T↑
Scrolling down the reversed title	T↓
Normal display mode	No indicatior

Superimposing a Title on Your Tape

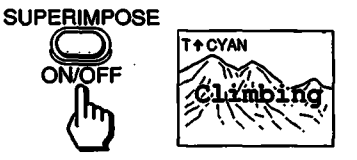
The following example shows you how to superimpose a title with the scrolling up effect.
The color and the display mode indicators inside the viewfinder will not be recorded.
Before superimposing the title, store it (page 39).



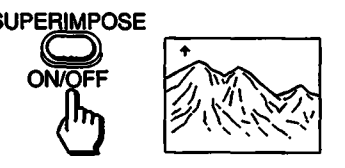
1 **In standby mode, press COLOR/MODE to select the display mode of the title.**
(For display modes of the title, see page 40.)



2 **In standby mode, press SUPERIMPOSE ON/OFF at the point you want to insert the title.**
The title appears.



3 **At the point you want to turn off the title, press SUPERIMPOSE ON/OFF again.**
The title goes out.



Function of the COLOR/MODE button

This button has two functions: one is to select the title color and the other is to select the title display mode.
If the title is displayed, this button acts as the color selection button, but if it is not, it acts as the mode select button.

To superimpose a title at the beginning

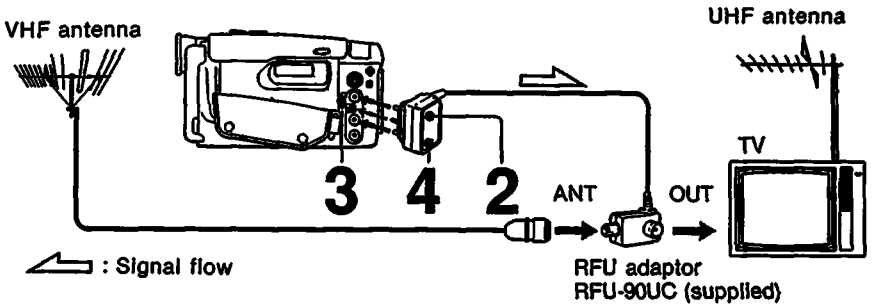
1 Set the camcorder to standby mode.
2 Press SUPERIMPOSE ON/OFF.
3 Start recording with the title displayed inside the viewfinder.
4 At the point you want to turn off the title, press SUPERIMPOSE ON/OFF again.

Playing Back a Tape

This section describes several other methods to connect your camcorder to your TV depending on the type of the TV in order to play back a picture on the TV.
To connect a TV that has video/audio inputs, see page 18.

If Your TV Has Only an Antenna Input

Use the supplied RFU adaptor to connect your camcorder to the TV. Make sure that the TV is turned off to prevent speaker damage before hooking up to your camcorder. The sound will be in monaural.



To connect your camcorder to a TV that already has a regular TV (VHF) antenna attached, you need to do the following procedure.

1 **Unplug the antenna cable from the TV.**
Plug the tail-end marked OUT of the RFU adaptor into the antenna input of your TV. Re-wire the antenna cable you unplugged to the RFU adaptor marked ANT.
This way, you can switch between TV broadcasts and your home video playback without re-wiring.

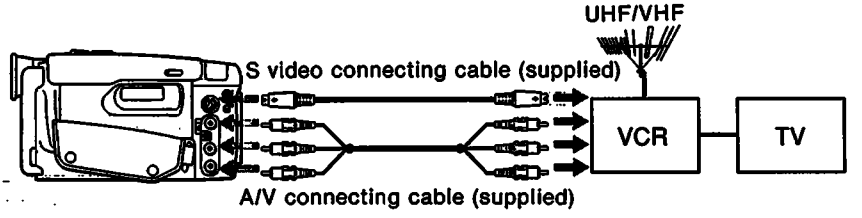
2 **Connect the RFU adaptor to the camcorder.**

3 **Slide the INPUT/OUTPUT switch on the camcorder to OUTPUT.**

4 **Set the channel selector on the RFU adaptor (and your TV channel) to 3CH or 4CH of the VHF channel, whichever is not active (vacant) in your area.**

Connecting to a TV via a VCR

You can connect the camcorder to a TV via a VCR.



1 Connect the camcorder to the VCR using the supplied A/V connecting cable.
   - If your TV has an S video input jack, connect it to the S VIDEO jack on the camcorder using the S video connecting cable (supplied). In this case, you do not need to connect the yellow (video) plug of the A/V connecting cable.
   - If your TV is a monaural type, connect only the white plug for audio both on the camcorder and the TV. Do not use the red plug. In this case, the sound will be in monaural.
2 Slide the INPUT/OUTPUT switch on the camcorder to OUTPUT.
3 Set the TV/VCR selector on the TV to VCR.

Various Playback Modes

Still picture (playback pause)

To view a still picture, press ▮▮ PAUSE during playback.
▮▮ appears in the display window.
To resume normal playback, press ▷ or ▮▮.

Note
When still picture mode lasts for 5 minutes or more, the camcorder automatically stops.

High-speed picture search

To monitor a picture in high-speed and locate a desired scene quickly, keep pressing ◀◀ or ▶▶ during playback.
To resume normal playback, release the button.

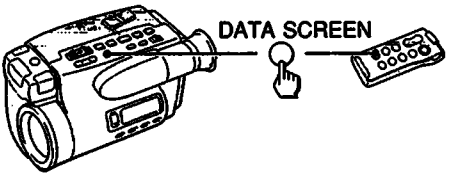
High speed search during fastfoward or rewind (skip scan)

You can also go into high speed seach during fastfoward or rewind to locate a desired scene more quickly. Press ◀◀ while rewinding or ▶▶ while advancing the tape.
To resume normal playback, press ▷ .

Note
During various playback modes, streaks appear on the screen and the sound is muted.

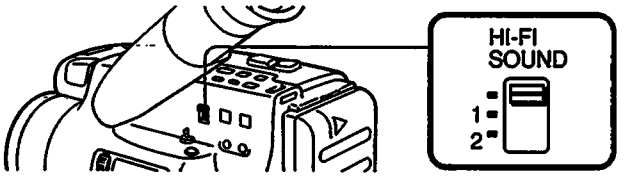
Displaying the viewfinder screen indicators on the TV

Press DATA SCREEN on the camcorder or the Remote Commander.
The indicator in the viewfinder screen appears ono the TV.
To erase the indicator, press DATA SCREEN again.



Selecting the monitor sound

You can select the playback sound with the HI-FI SOUND switch.



- Normally, set the HI-FI SOUND switch to the "Green position".
- When you play back a tape with monaural sound, monaural sound will come out from the both audio jacks with the switch set to the "Green position".
- Set the switch to "1" or "2" only when playing back a dual sound track tape such as a bilingual soundtrack tape.

In playback pause mode

You can view the picture in a sequence of stop-motion images by pressing EDITSEARCH. If you keep pressing EDITSEARCH, you can view the picture playback in forward or reverse direction.

Displaying the Recording Date or Time - Data Code Function

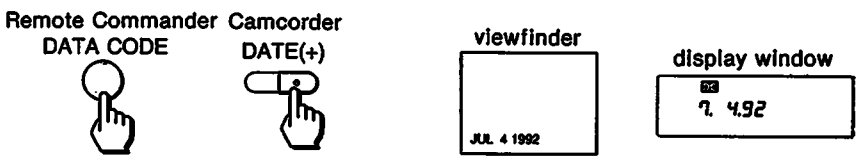
Even if you didn't record date or time, you can display the recording date or time (data code) on the TV during playback or editing. You can also display the data code inside the viewfinder and in the display window at the same time. Each time you press DATA CODE on the Remote Commander, the display changes as follows:

Date → Time → No indicator

Displaying the recording date

Press DATE (+) on the camcorder, or press DATA CODE on the Remote Commander.

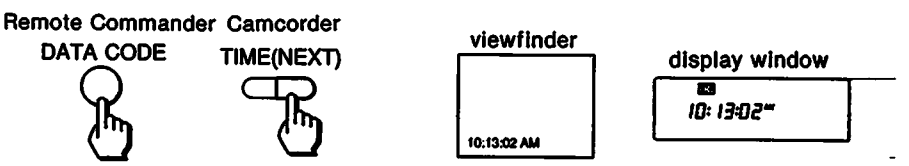
To erase the date, press DATE (+) again or DATA CODE twice.



Displaying the recording time

Press TIME (NEXT) on the camcorder, or press DATA CODE on the Remote commander twice.

To erase the time, press TIME (NEXT) or DATA CODE again.



Note on the data code

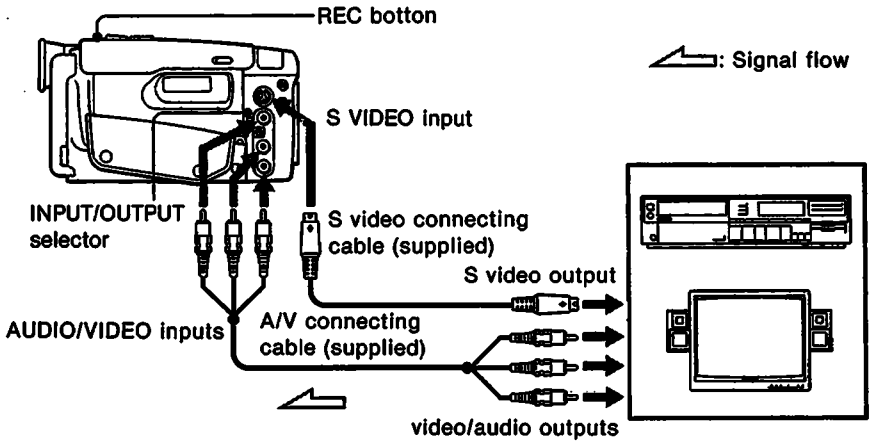
When bars(−:− −:− −) appear in place of the data code, it indicates:

- A blank portion of the tape is being played back.
- The tape was recorded in LP mode.
- The tape was recorded by another camcorder without a data code function.
- The tape is unreadable due to tape damage or noise.
- The tape is recorded without having date and time set.

Recording

Recording from a VCR or TV

You can record a tape from another VCR, or a TV program from the TV equipped with video/audio outputs.



- Disconnect the RFU adaptor from the camcorder if it is connected.
- Make the connections using the suupplied A/V connecting cable.
- If your TV has an S video output jack, connect it to the S VIDEO jack on the camcorder using the S video connecting cable (supplied). In this case, you do not need to connect the yellow (video) plug of the A/V connecting cable.
- If your TV is a monaural type, connect only the white plug for audio both on the camcorder and the TV or the VCR. Do not use the red plug. In this case, the sound will be in monaural.
- When the cable plugs are connected to both the S VIDEO jack and the VIDEO jack on the camcorder, the signal input to S VIDEO is selected automatically. To use VIDEO jack, disconnect the S video connecting cable.

To record

1 Make sure that the INPUT/OUTPUT selector is set to INPUT.
2 Set the POWER switch on the camcorder to VTR.
3 Insert a tape in the camcorder.
4 Turn on the VCR or TV.
5 Play back the tape (in another VCR) or select the TV channel to be recorded.
6 Slide ● REC in the direction of the arrow.
Recording starts. You can monitor the picture being recorded inside the viewfinder.

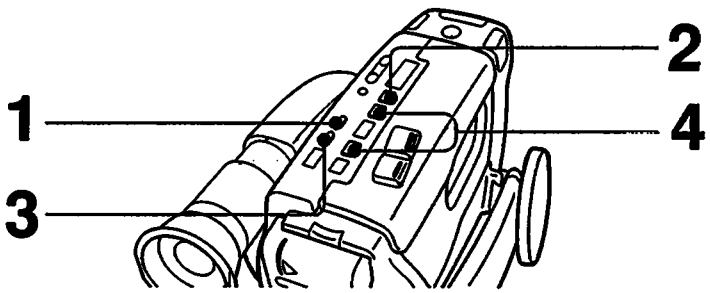
Using the Tape Counter

The tape counter tells you the actual recording or playback time. You can also use the tape counter to memorize a specific point on the tape.
The tape counter does not work on blank portions of the tape.

To count the whole tape

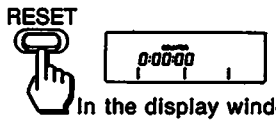
Press RESET at the beginning of the tape so that the counter shows "0:00:00".

To return to a preset point



1 **During playback, press RESET at the point you later want to locate.**

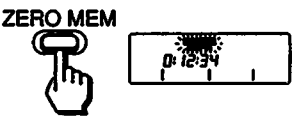
The counter shows "0:00:00".



2 **Press □ when playback has finished, as usual.**

3 **Press ZERO MEM.**
The "ZERO MEM" indicator flashes.

Note
The ZERO MEM does not function during recording or playback.



4 **Press ◀◀ or ▶▶.**

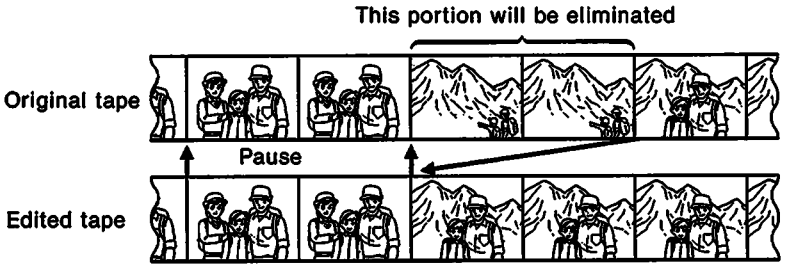
The tape rewinds or advances and stops automatically when the counter reaches approximately zero.

Note

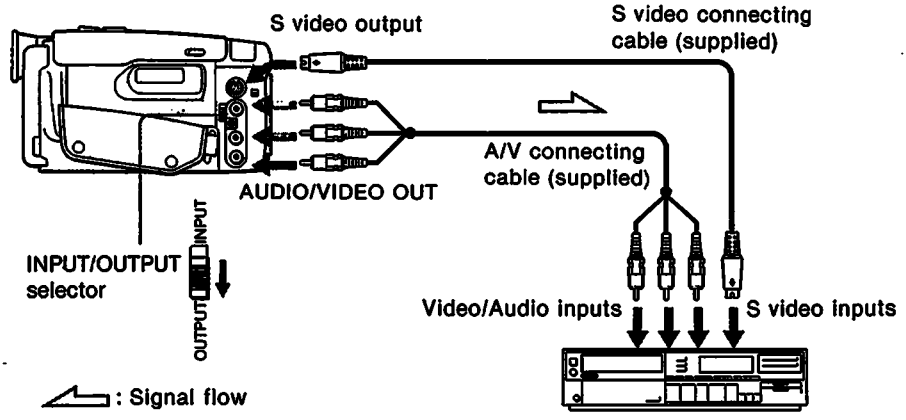
The counter reading and the point on the tape may not correspond exactly. Use the counter as a guide. There will be a time lag of several seconds especially when you fast-forward or rewind repeatedly and also if you play back a tape recorded in LP (Long play) and SP (Standard Play) modes mixed.

Editing Tapes with a VCR

You can create your own video program by editing with any other 8 8mm, Hi 8 Hi8 mm, β Betamax, ED Beta ED Betamax, VHS VHS, S-VHS S-VHS, VHSC VHSC, S-VHSC S-VHSC VCRs that has video/audio inputs.



Connection



1 Connect the camcorder and the VCR using the supplied A/V connecting cable.
2 Set the input selector on the VCR to LINE, if available.
- If your VCR has an S video input jack, connect it to the S VIDEO jack on the camcorder using the S video connecting cable (supplied). In this case, you do not need to connect the yellow (video) plug of the A/V connecting cable.
- If your VCR is a monaural type, connect only the white plug for audio both on the camcorder and the VCR. Do not use the red plug. In this case, the sound will be in monaural.

How to edit

1 **Insert a tape to be recorded into the recording VCR.**
2 **Slide EDIT on the camcorder in the direction of the arrow.**
The EDIT switch optimizes the video signal when editing to another VCR.
3 **Make sure that INPUT/OUTPUT is set to OUTPUT.**
4 **While pressing the small green button on the POWER switch, slide it to VTR.**
5 **Insert your recorded tape into the camcorder.**
6 **Play back the tape on the camcorder until you locate the point where you want to start editing, then set the camcorder to the playback pause mode.**
7 **On the recording VCR, locate the recording start point and set the VCR to the recording pause mode.**
8 **Press ❚❚ PAUSE on the camcorder and VCR simultaneously to start editing.**

To edit more scenes

Repeat steps 6 to 8.

To stop editing

Press □ on both the camcorder and the VCR.

Use of the EDITSEARCH button

You can play back a tape in normal/reverse direction by keep pressing EDITSEARCH during recording pause or playback pause. You can also play back still pictures successively at specific intervals by pressing EDITSEARCH intermittently.

Use of the EDIT switch

When you slide EDIT in the direction of the arrow (EDIT ON), you can keep picture and deteriorations resulting from editing to a minimum. However, when you edit or copy to another VCR, avoid using the edited tape for multiple generations of editing. After editing, be sure to set this switch in the opposite direction of the arrow (EDIT OFF).

Note on DATA SCREEN function

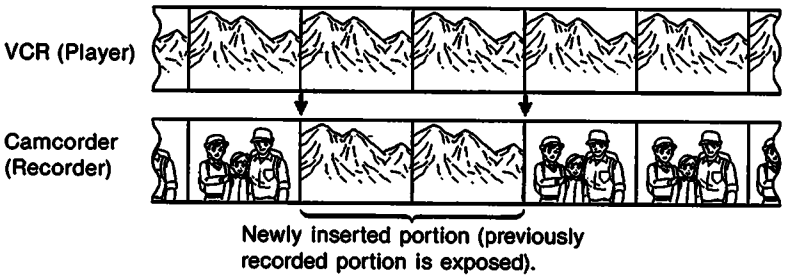
If you have displayed the viewfinder screen indicators on the TV (DATA SCREEN function), erase the indicators by pressing DATA SCREEN so that they will not be superimposed on the edited tape.

Note on the Data Code singnal

Data code signal is not output from the S VIDEO or VIDEO jack on the camcorder. But, you can record the recording date or time displayed on the TV or inside the viewfinder onto the editing tape.

Replacing Recording on a Tape (Insert Editing)

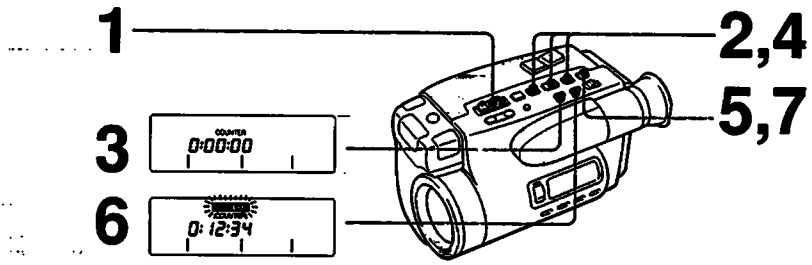
You can insert a new scene from a VCR onto your originally recorded tape by specifying starting and ending points.



Connection

Connections are the same as in "Recording from a VCR or TV (page 45)". Before you begin replacing recordings, **set the VCR to the playback pause mode at the beginning of the scene to be recorded.**

To replace recordings



1 **While pressing the small green button on the POWER switch, slide it to VTR.**
The counter appears in the display window.
2 **Locate the end point where the insert should end by pressing ◀◀ or ▶▶ during playback.**
The viewfinder screen shows a high-speed playback picture.
3 **At the end point, press RESET.**
The counter resets to "0:00:00".
4 **Locate the start point where the insert should begin by pressing ◀◀.**
5 **At the start point, put the camcorder into recording pause mode.**
6 **Press ZERO MEM.**
The end point of the insert is stored in memory.
The ZERO MEM indicator flashes in the display window.
7 **Press ▮▮ on both the camcorder and the VCR to start insert editing.**
You can monitor the picture being inserted inside the viewfinder.
The insert recording stops automatically near the zero point on the counter.

To change the end point

Press ZERO MEM so that the ZERO MEM indicator disappears, and begin from step 2.

Usable Cassettes and Recording/Playback Modes

This section describes the usable cassettes and recording/playback modes with your camcorder.

Selecting Cassette Types

The Hi8 system is an extension of the standard 8 mm system, and was developed for a higher-quality picture.
You can use Hi8 video and standard 8 mm cassettes with your camcorder. But, when you want to record in Hi8 system, you can use only the Hi8 video cassettes. A standard 8 mm cassette cannot be recorded in the Hi8 system.

When the Hi 8 AUTO/OFF switch is set to AUTO, the recording system is automatically selected according to the type of cassette you're using.
— Hi8 cassette recorded in the Hi8 system.
— Standard 8 mm cassette recorded in the standard 8 mm system.

If you use a Hi8 cassette in the standard 8 mm recording system, set the Hi8 AUTO/OFF switch to OFF while recording.

To Record in	Use Cassette Type	Set the Hi 8 AUTO/OFF switch to
Hi8 Hi 8 system	Hi8 type	AUTO
Standard 8 mm 8 system	Hi8 type	OFF
	Standard 8 mm type	AUTO or OFF

If you are going to play back the tape using a standard 8 mm video recorder, you should record the tape in the standard 8 mm system.

When You Play Back

The Playback mode is selected automatically according to the recording system (Hi8/standard 8mm, SP/LP) with which the tape has been recorded.

AFM Hi-Fi stereo

In the following cases, the sound will be in monaural.
- When you play back a tape recorded with this camcorder on an AFM HI-FI monaural video recorder.
- If you play back a tape with this camcorder that has been recorded on AFM Hi-Fi monaural video recorder.

Dual sound

You can playback a dual sound recorded tape.
Set the Hi-Fi SOUND switch to "1" or "2". For details, see page 44.

Foreign 8 mm video

You may not be able to play back foreign pre-recorded software because of the difference in the TV color systems.

LP mode

When you play back a tape recorded in LP (long play) mode, the LP indicator lights up inside the viewfinder. This camcorder cannot record tape in LP mode.

RC time code

This camcorder automatically marks the RC time code during camera recording, but cannot display the RC time code in the viewfinder and display window during playback or editing. When you want to display the RC time code, use another video equipment with the RC time code displaying function.

Maintenance Information

This section shows you how to maintain the camcorder.

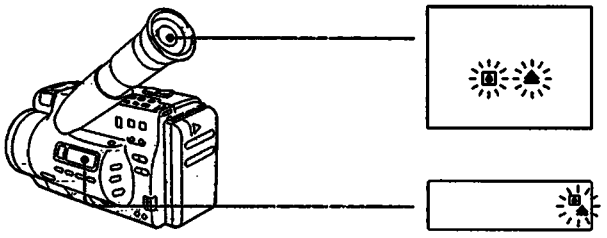
Moisture Condensation

If the camcorder is brought directly from a cold place to a warm place, moisture may condense inside the camdcorder, on the surface of the tape, or on the lens.

In this condition, the tape may stick to the head drum and be damaged or the camcorder may not operate correctly. To prevent possible damage under these circumstances, the camcorder is furnished with moisture sensors. However, take the following precautions.

Inside the camcorder

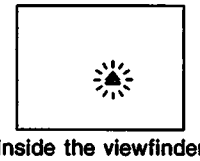
If moisture condenses inside the camcorder, the [] indicator iniside the viewfinder and in the display window flashes. When the cassette is inserted, the ⏏ indicator also flashes.



If this happens, no other functions except for tape ejection will work.
Eject the tape, turn off the camcorder and leave it with the cassette holder open for at least 1 hour in a dry place.
The camcorder can be used again if the [] indicator does not appear when the power is turned on again.

On the surface of the tape

When the cassette is inserted and a tape transport button (▷, ▶▶, etc.) is pressed, the ⏏ indicator in the display window flashes.



Inside the viewfinder

Insuch case, no other functions except for tape ejection will work.
Eject the tape, turn off the camcorder and leave it with the cassette holder open for at least 1 hour in a dry place.
The camcorder can be used again if the ⏏ indicator does not appear when you insert the cassette and press one of the tape transport buttons.

On the lens

If moisture condenses on the lens, no indicator appears, but the picture becomes dim. Turn off power and do not use the camcorder for about 1 hour.

How to prevent moisture condensation

When bringing the camcorder from a cold place to a warm place, put the camcorder in a plastic bag and allow it to adapt to room conditions over a period of time.

1 Be sure to tightly seal the plastic bag containing the camcorder.
2 Remove the bag when the air temperature inside it has reached the temperature surrounding it (after about one hour).

Video Head Cleaning

To ensure clear pictures, clean the video heads periodically.
When playback pictures are noisy or hardly visible, the video heads may be contaminated.

Slight contamination → Critical contamination

If this happens:

1 Clean the video heads with the Sony V8-25CLH cleaning cassette (not supplied).
2 After cleaning, check to see if the picture is clear by recording or playing back with an ordinary tape.
3 If the picture is still noisy, repeat the cleaning. (Do not repeat cleaning more than 5 times.)

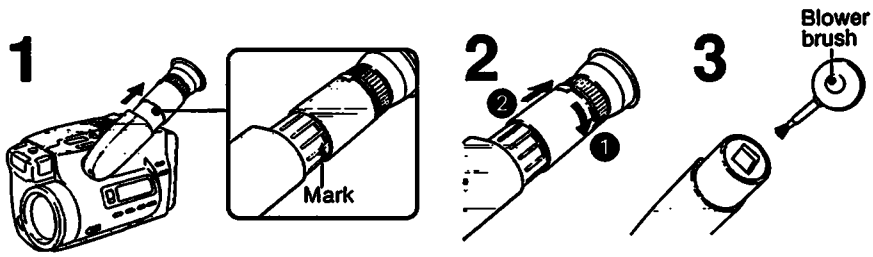
If the V8-25CLH cleaning cassette is not available in your area, consult your Sony service facility.

Caution
Do not use a commercially available wet-type cleaning cassette. It may damage the video heads.

Cleaning

Viewfinder

You can remove dust inside the viewfinder.



1 Pull out viewfinder barrel until the illustrated mark appears.
2 Turn the viewfinder counterclockwise until it stops (❶) and pull it out (❷).
3 Clean the surface of the cover with a commercially available blower brush.
If you want to remove the dust on the lens, use an applicator.

After cleaning, push in the viewfinder barrel and align it with the △ mark on the viewfinder. Then turn it clockwise until it stops and push it in.

Lens

Clean the lens with a soft brush to remove dust. If there are fingerprints on it, remove them with a soft cloth.

Body

Clean the camcorder body with a dry soft cloth, or a soft cloth lightly moistened with a mild detergent solution. Do not use any type of solvent which may damage the finish.

Tips for Better Camera Recording

This section describes some hints for better shooting.

Achieving Better Camera Recording

You can get better pictures following the hints below.

How to hold the camcorder

For hand-held shots, it is important to hold the camcorder properly.

- Hold the camcorder firmly and secure it with the grip belt so that you can easily manipulate the camcorder with your thumb.
- Place your right elbow firmly against your side.
- Place your left hand under the camcorder to support it.
  When adjusting the focus manually, make sure the camcorder does not move.
- Stand opposite the subject and let your feet take a comfortable stance.
- Place your eye firmly against the viewfinder eyecup.

Use a tripod

If you have a tripod for a still camera, you can also use it with the camcorder. If a tripod is not available, try placing the camcorder on a table top or any other flat surface of suitable height.

Caution

When attaching a tripod not manufactured by Sony, the length of the camera mounting screw must be less than 6.5 mm (9/32 inches). Otherwise, the screw may damage the inner part of the camcorder.

Keep the horizontal plane level

You can easily determine the horizontal plane by using the viewfinder frame as a reference.

Shoot with the sun behind you

When the light source is behind the subject, or in the following situations, the subject will be recorded too dark and the background too light.

- The subject is indoors and there is a window behind the subject.
- Bright sources such as fluorescent or incandescent lamps are included in the scene.
- You are shooting a person wearing white or shiny clothes in front of a white background.
  In this case, the face will be recorded too dark.
  If it occurs, use the manual EXPOSURE function. (See page 35.)

Use the video light in the dark

To get the best colors, you must maintain a very high lighting level. When using a video light, attach it to this camcorder with a video light attachment (not supplied).

Precautions

On operation

- Operate the camcorder on 6.0 V (battery pack), 7.5 V (AC power adaptor).
- For DC or AC operation, use the accessories recommended in this manual.
- Should any solid object or liquid fall into the casing, unplug the camcorder and have it checked by qualified personnel before operating it any further.
- Do not pick up the camcorder by the viewfinder as shown in the left illustration.

Tips for Better Camera Recording

- Do not place the camcorder so as to point the viewfinder toward the sun. The inside of the viewfinder heats up and may be damaged. Avoid leaving the camcorder next to a window or in direct sunlight.
- Avoid rough handling or mechanical shock. Be particularly careful of the lens.
- Keep the lens cap on the lens when not using the camcorder.
- Do not wrap up the camcorder and operate it since heat may build up internally.
- Keep the camcorder away from strong magnetic fields or mechanical vibration.
- **Do not let sand get into the camcorder.**
  When you use the camcorder on a sandy beach or dusty place, protect it from the sand or dust. Sand or dust may cause the camcorder to malfunction and sometimes the malfunction cannot be repaired.
- **Do not let the camcorder get wet.**
  Keep the camcorder from rain or sea water. It may cause malfunction and sometimes the malfunction cannot be repaired.

On handling tapes

- Don't insert anything in the small holes on the rear of the cassette. These holes are used to sense the type of tape, thickness of tape, or if the tab is out or in, etc

On care

- Never leave the camcorder under temperatures above 140°F (60°C), such as in a car parked in the sun or under direct sunlight.
- When the camcorder is not to be used for a long time, disconnect the power source and remove the tape. Periodically turn on the power, operate the camera and player sections and play back a tape for about 3 minutes.

On copyright Television programs, films, video tapes and other materials may be copyrighted. Unauthorized recording of such materials may be contrary to the provision of the copyright laws.

Using Your Camcorder Abroad

Each country has its own electricity and TV color systems.
Before using your camcorder abroad, check the following points.

Power sources You can use your camcorder in any country with the supplied AC power adaptor within 100 V to 240 V AC, 50/60 Hz. If you cannot attach the power adaptor to the wall outlet, use a power cord plug adaptor (not supplied).

Difference in Color Systems This camcorder is an NTSC system-based camcorder. If you want to view the playback picture on a TV, it must be an NTSC system based TV or a PAL-M system based TV with NTSC/PAL-M transcoder. Check the following alphabetical list.

NTSC system countries
Bahama Islands, Bolivia, Canada, Central America, Chile, Colombia, Ecuador, Jamaica, Japan, Korea, Mexico, Peru, Surinam, Taiwan, the Philippines, the U.S.A., Venezuela, etc.

PAL system countries
Australia, Austria, Belgium, China, Denmark, Finland, Germany (former West Germany), Great Britain, Holland, Hong Kong, Italy, Kuwait, Malaysia, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, etc.

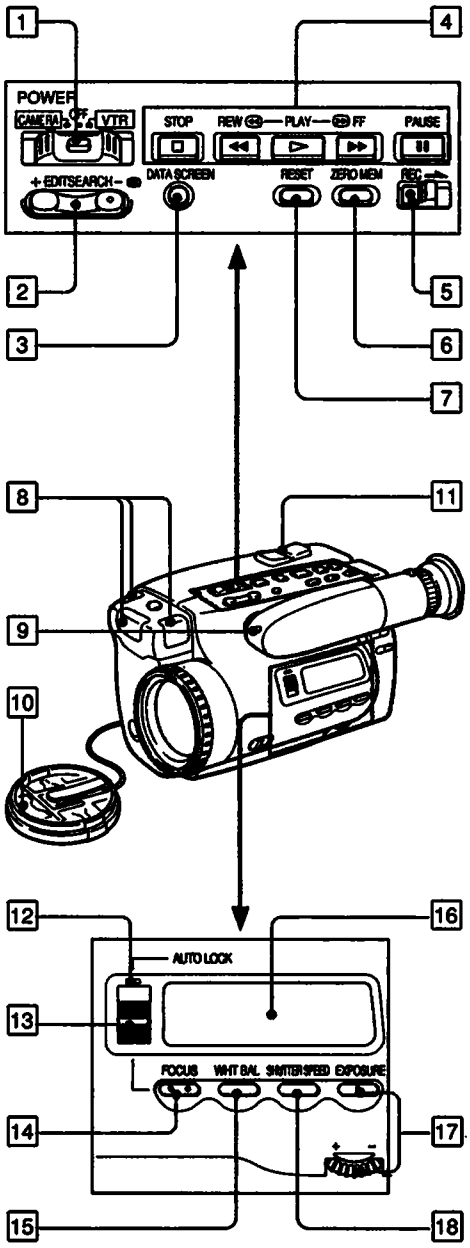
PAL M system country
Brazil

PAL N system countries
Argentina, Paraguay, Uruguay

SECAM system countries
Bulgaria, France, Guiana, Hungary, Iran, Iraq, Monaco, Poland, former Soviet Union, etc.

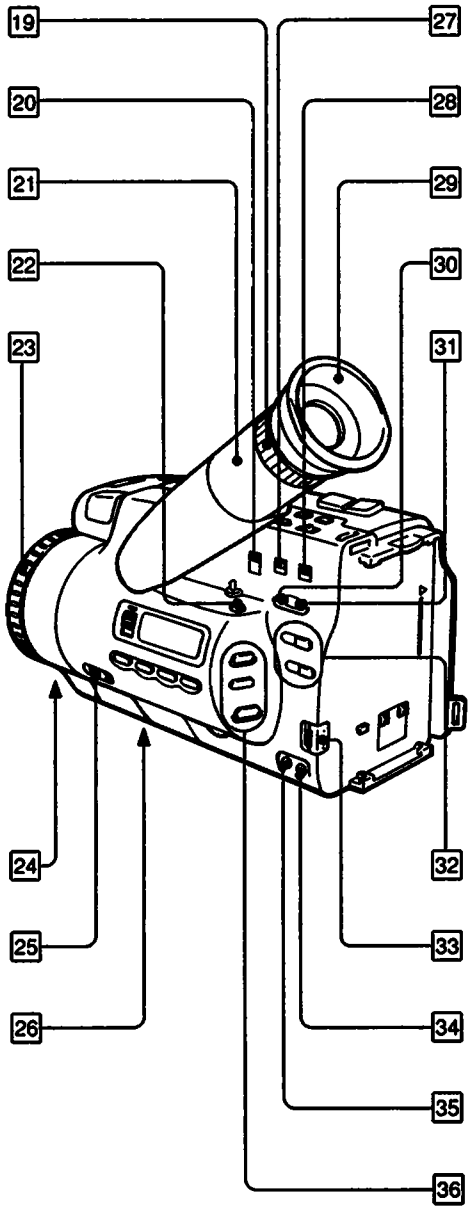
World clock You can use the world clock function abroad.
For details, see page 29.

Identifying the Parts



For details on the use of each part, refer to the pages indicated in the parenthesis.

1. POWER switch (14), (19)
2. EDITSEARCH button (26), (48)
3. DATA SCREEN button (43)
4. Tape transport buttons (19), (43)
   - ▷ (palyback)
   - ▶▶ FF (fast forward)
   - ◀◀ REW (rewind)
   - □ (stop)
   - ▮▮ (pause)
5. ● REC (recording) switch (45)
6. ZERO MEM (zero memory) button (27), (46)
7. RESET button (27), (46)
8. Built-in Microphone (stereo/zoom) (16)
9. Recording/battery lamp (15), (59)
10. Lens cap (14), (16)
11. Power zoom button (16)
12. AUTO LOCK lamp (15), (31)
13. AUTO LOCK switch (15), (31)
14. FOCUS button (32)
15. WHT BAL (white balance) button (33)
16. Display window (59), (60)
17. EXPOSURE button and dial (35)
18. SHUTTER SPEED button (36)



19 Viewfinder lens adjustment ring (13)

20 HI-FI SOUND switch (44)

21 Viewfinder (13)

22 REC start/stop button (25)

23 Focus ring (32)

24 FADER button (37)

25 STEADY SHOT switch (17)

26 Lithium battery compartment (8)

27 EDIT switch (48)

28 Hi8 AUTO/OFF switch (50)

29 Eyecup (13)

30 DST button (11), (29)

31 AREA button (29)

32 DATE and TIME buttons (10), (44)

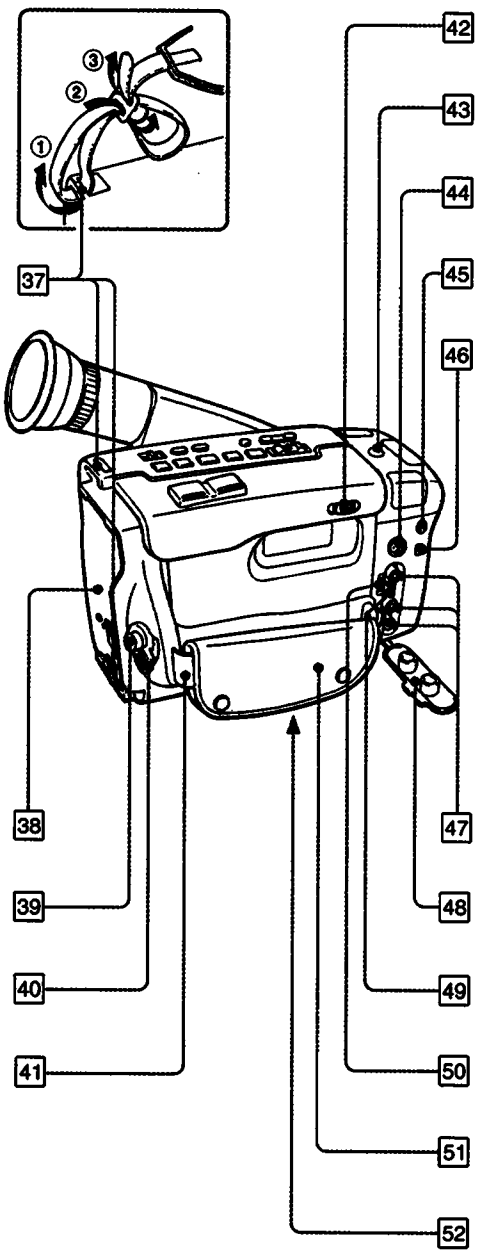
33 BATT (battery eject) knob (7)

34 PHONES (headphones) jack (stereo mini-jack) (26)

35 REMOTE control jack (mini-mini-jack)

36 SUPERIMPOSE buttons (39)—(41)
MEMORY button
COLOR/MODE button
SUPERIMPOSE ON/OFF button

About (LANC)
stands for Local Application Control Bus System. The control jack is used for controlling the tape transport of video equipment and peripherals connected to it. This jack has the same function as the connectors indicated as CONTROL L or REMOTE.



37 Hooks for shoulder strap

38 Battery mounting surface

39 START/STOP button (15)

40 STANDBY switch (15)

41 Grip strap (14)

42 Lid lock (12)

43 Remote Control Sensor (20)

44 S VIDEO jack (18)

45 MIC jack (PLUG IN POWER) (stero mini-jack) (28)

46 BUILT-IN MIC switch (16)

47 VIDEO/AUDIO jacks (phono jacks) (18)

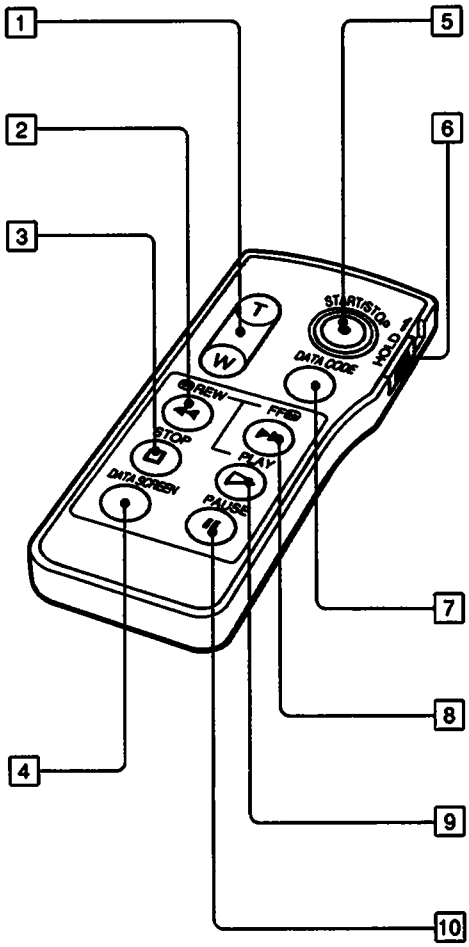
48 Jack cover

49 RFU DC OUT (DC output) jack (28)

50 VIDEO/AUDIO INPUT/OUTPUT selector switch (18)

51 Grip strap cover (14)

52 Tripod receptacle (53)



1 Power zoom button (16)

2 ◀◀ REW (rewind) button (19), (43)

3 □ STOP button (19)

4 DATA SCREEN button (43)

5 START/STOP button (15)

6 HOLD switch (20)

7 DATA CODE button (44)

8 ▶▶ FF (fast forward) button (19), (43)

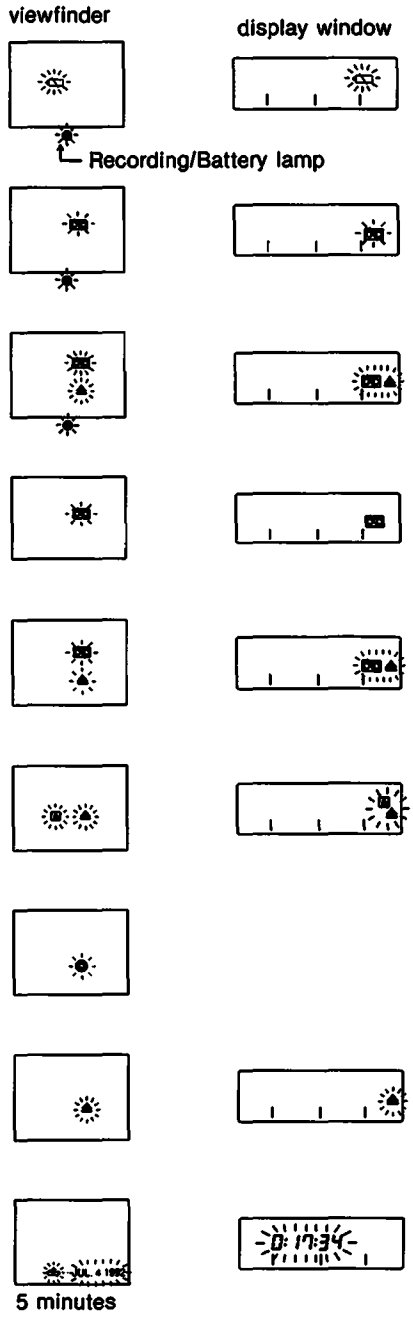
9 ▷ PLAY (playback) button (19)

10 ❚❚ PAUSE button (43)

Indicators inside the Viewfinder and in the Display Window

Warning Indicators

If indicators flash inside the viewfinder or in the display window or a caution lamp on the camcorder flashes, check the following:



Battery Remaining
Slow flashing: The battery is weak.
Fast flashing: The battery is dead.

The tape is near the end.

The tape has run out.

No tape has been inserted.

The tab on the tape is out (red).

Moisture condensation has occurred.

The video heads may be contaminated.

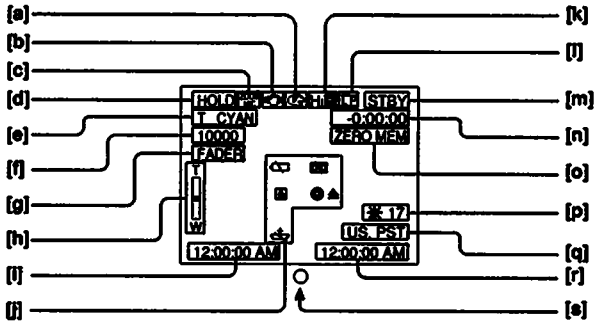
Some other trouble has occured.
Disconnect the power source and contact your Sony dealer or local authorized facility.

The lithium battery is weak or the lithium battery is not installed.

Indicators inside the Viewfinder and in the Display Window

Inside the Viewfinder

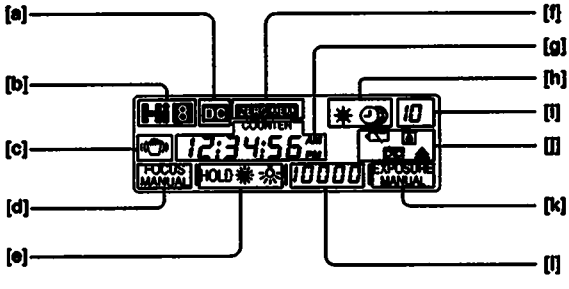
For details on each indicator, refer to the pages idicated in parentheses.



[a] Manual focusing ( ) (32)
[b] Lights up while correcting camera-shake. (17)
[c] Lights up while setting BUILT-IN MIC to the ZOOM MIC. (16)
[d] White balance mode (, , HOLD) (33)
[e] Title mode and color (40)
[f] Shutter speed (36)
[g] FADER has been pressed (37)
[h] Power zoom indicator (16)
Exposure indicator (35)
[i] Data code (44)
[j] Warning indicators (59)
[k] Lights up while recording in Hi8 system (50)
[l] Lights up when playing back a tape recorded in LP mode. (50)
[m] Tape transport mode (19), (43)
[n] Tape counter (15), (46)
[o] ZERO MEM is pressed. (27), (46)
[p] Area number (10), (30)
[q] Area name (10), (30)
[r] Date or Time (10)
[s] Lights up during recording.
When flashing: "Change battery or cassette." (15), (59)

In the Display Window

For details on each indicator, refer to the pages indicated in parentheses.



[a] Data code (44)
[b] Playing back or recording in Hi8 format (50)
[c] Appears while correcting camera-shake (17)
[d] Manual focusing (32)
[e] White balance mode (33)
[f] ZERO MEM is pressed. (27), (46)
[g] Tape counter, time, date, or tape counter indicator (10), (15), (46)
[h] World clock indicator (10), (30)
[i] Area number (30)
[j] Warning indicators (59)
[k] Adjusting exposure manually (35)
[l] Shutter speed (36)

Trouble Check

If you run into any problems using the camcorder, use the following table to troubleshoot the problem.

	Symptom	Cause	Corrective Actions	page
Power	The power does not go on.	The battery is not attached.	Attach the battery.	7
		The battery is dead.	Use a charged battery.	6
		The AC power adaptor is not connected to a wall outlet.	Connect the adaptor to a wall outlet.	23
	The power goes off.	While being operated in CAMERA mode, the camcorder has been in the pause mode for more than 5 minutes.	Turn STANDBY to LOCK at once and turn it to STANDBY again.	16
		The battery is dead.	Use a charged battery.	6
	The battery pack is quickly discharged.	The ambient temperature is too low.	—	21
		The battery pack has not been charged fully.	Charge the battery pack again.	6
		The battery pack is completely dead, and cannot be recharged.	Use another battery pack.	22
Operation	START/STOP does not operate.	The tape is stuck to the drum.	Eject the tape.	15
		The tape has run out.	Rewind the tape or use a new one.	—
		The POWER switch is set to VTR.	Set it to CAMERA.	14
		The tab on the cassette is out (red).	Use a new tape or slide the tab.	28
	The cassette cannot be removed from the compartment.	The battery is dead.	Use a charged battery or the AC power adaptor.	7, 23
	No function except for cassette ejection works.	Moisture condensastion has occurred.	Remove the cassette and do not use the camcorder for at least an hour.	51
	The tape does not move when a tape transport button is pressed.	The POWER switch is set to CAMERA or OFF.	Set it to VTR.	19
		The tape has run out.	Rewind the tape or use a new one.	—
	The STEADY SHOT function does not activate.	The STEADY SHOT switch is set to OFF.	Set the STEADY SHOT switch to ON.	17
	The autofocusing function does not work.	The AUTO LOCK switch is slid down.	Slide the AUTO LOCK switch up to turn on the AUTO LOCK lamp.	14, 31
		Shooting conditions are not suitable for autofocusing operation.	Slide the AUTO LOCK switch down to turn off the AUTO LOCK lamp and press FOCUS to adjust the focus manually.	32

(Continued)

	Symptom	Cause	Corrective Actions	page
Operation	No sound or only a low sound is heard when playing back a tape.	The stereo tape is played back with the HI-FI SOUND switch set to " 1 " or " 2 "	Set to "Green position".	44
	Recording on another tape is impossible.	The INPUT/OUTPUT selector is set to INPUT.	Set to OUTPUT.	47
	Recording a TV program or recording from another tape is impossible.	The INPUT/OUTPUT selector is set to OUTPUT.	Set to INPUT.	45
Picture	The image on the viewfinder screen is not clear.	The viewfinder lens is not adjusted.	Adjust the viewfinder lens.	13
	A vertical band apperas when a subject such as lights or a candle flame is shot against a dark background.	The contrast between the subject and background is too high: The camcorder is not malfunctioning.	Change locations.	—
	The color of the palyback picture is not appropriate.	The AUTO LOCK switch was slid down.	—	31
		Shooting conditions were not suitable for auto white balance operation.	—	33
	The playback picture is not clear.	EDIT is set in the direction of the arrow.	Set EDIT in the opposite direction of the arrow.	48
		The channel or input for the camcorder is not selected on the TV.	Select correctly.	18, 42
	The picture is noisy.	The video heads may be contaminated.	Clean the heads using the Sony V8-25CLH cleaning cassette.	52
Others	The supplied Remote Commander does not work.	The remote sensor has not been popped up.	Push the head of the remote sensor so that the remote sensor pops up.	20
		Something interrupts the infrared rays.	Take off the obstacles.	20
		The lithium battery is not inserted with the correct polarity.	Insert the lithium battery with the correct polarity.	9
		The lithium battery is dead.	Insert a new one.	9
		The HOLD switch is working.	Set the switch in the direction opposite the arrow.	20
	There is dust inside the viewfinder.	—	Pull out the view finder and clean the viewfinder screen cover or viewfinder lens.	52
	Bubbles appear inside the lens.	When you use the camcorder where the air pressure is low such as on a mountain or in an airplane, you may find bubbles inside the lens. This is not a malfunction, and will not hinder recording. Bubbles will usually disappear after about a week. But, how long it takes depends on the air pressure and use.	—	—

Specifications

System

Video recording system
Four Rotary heads, Helical scanning FM system
Audio recording system
Rotary head, FM system
Video signal NTSC color, EIA standards
Usable cassette
8 mm video format cassette (Hi8 or standard 8 mm)
Tape speed SP mode: Approx. 1.43 cm (19/32 inches) /sec
LP mode: Approx. 0.72 cm (5/16 inches) /sec (playback only)
Recording time
SP mode: 2 hours (E6/P6-120)
Playback time SP mode: 2 hours (E6/P6-120)
LP mode: 4 hours (E6/P6-120)
Fastforward/rewind time
Approx. 8 min. (E6/P6-120)
Image device CCD (Charge Coupled Device)
Viewfinder Electronic viewfinder (monochrome)
Lens Combined 10 × power zoom lens
f=6.2 to 62 mm (1/4 to 2 1/2 inches)
45 to 450 mm (1 13/16 to 17 3/4 inches) when converted into a 35-mm still camera
F 1.6 to 2.9
Filter diameter 52 mm (2 1/8 inches)
TTL autofocus system inner focus wide macro system
Color temperature
Auto, HOLD, ☼ (indoors) 3,200 K, ☀ (outdoors) 5,800 K
Minimum illumination
3 lx (F 1.6)
Illumination range
3 lx to 100,000 lx
Recommended illumination
More than 100 lx

Input and output connectors

S video input/output
4-pin mini DIN
Luminance signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
Chrominance signal: 0.286 Vp-p, 75 ohms, unbalanced,
Video input/output
Selectable with the video/audio INPUT/OUTPUT selector
Phono jack, 1 Vp-p, 75 ohms, unbalanced, sync negative
Audio input/output
Phono jacks, (2: stereo L and R)
Input: −7.5 dBs, input impedance more than 47 kilohms
Output: −7.5 dBs, (at output impedance 47 kilohms)
impedance less than 2.2 kilohms
RFU DC OUT Special mini-jack, DC 5 V
Headphones jack
Stereo mini-jack (Ø 3.5)
Remote jack Stereo mini-mini-jack (Ø 2.5)
MIC jack Stereo mini-jack, −66 dBs low impedance with 2.5 to 3 V DC, output impedance 6.8 kilohms (Ø 3.5)

General

Power requirements
On battery mounting surface
6.0 V (battery pack)
7.5 V (AC power adaptor)
Power consumption
6.4 W (camera recording) including the viewfinder
Installation Vertically, Horizontally
Operating temperature
0 °C to 40 °C (32 °F to 104 °F)
Storage temperature
−20 °C to +60 °C (−4 °F to 140 °F)
Dimensions Approx. 109 × 106 × 189 mm (w/h/d)
(4 3/8 × 4 1/4 × 7 1/2 inches)
Weight Approx. 860 g (1 lb 14 oz) excluding the battery pack, lithium battery, cassette, lens cap, jack cover, and shoulder strap
Approx. 1090 g (2 lb 6 oz) including the battery pack NP-55H, lithium battery CR2025, cassette E6-60, lens cap, jack cover, and shoulder strap
Microphone Electret condenser microphone, stereo type
Supplied accessories
See page 5.

Design and specifications are subject to change without notice.

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If you have any question about this product, call:
Sony Customer Information Center
East Coast : 201-930-7669 (SONY) NJ
Central : 708-250-7669 (SONY) IL
West Coast : 714-821-7669 (SONY) CA

or write to:
Sony Customer Information Center
Sony Drive, Mail Drop #T1-11,
Park Ridge, NJ 07656